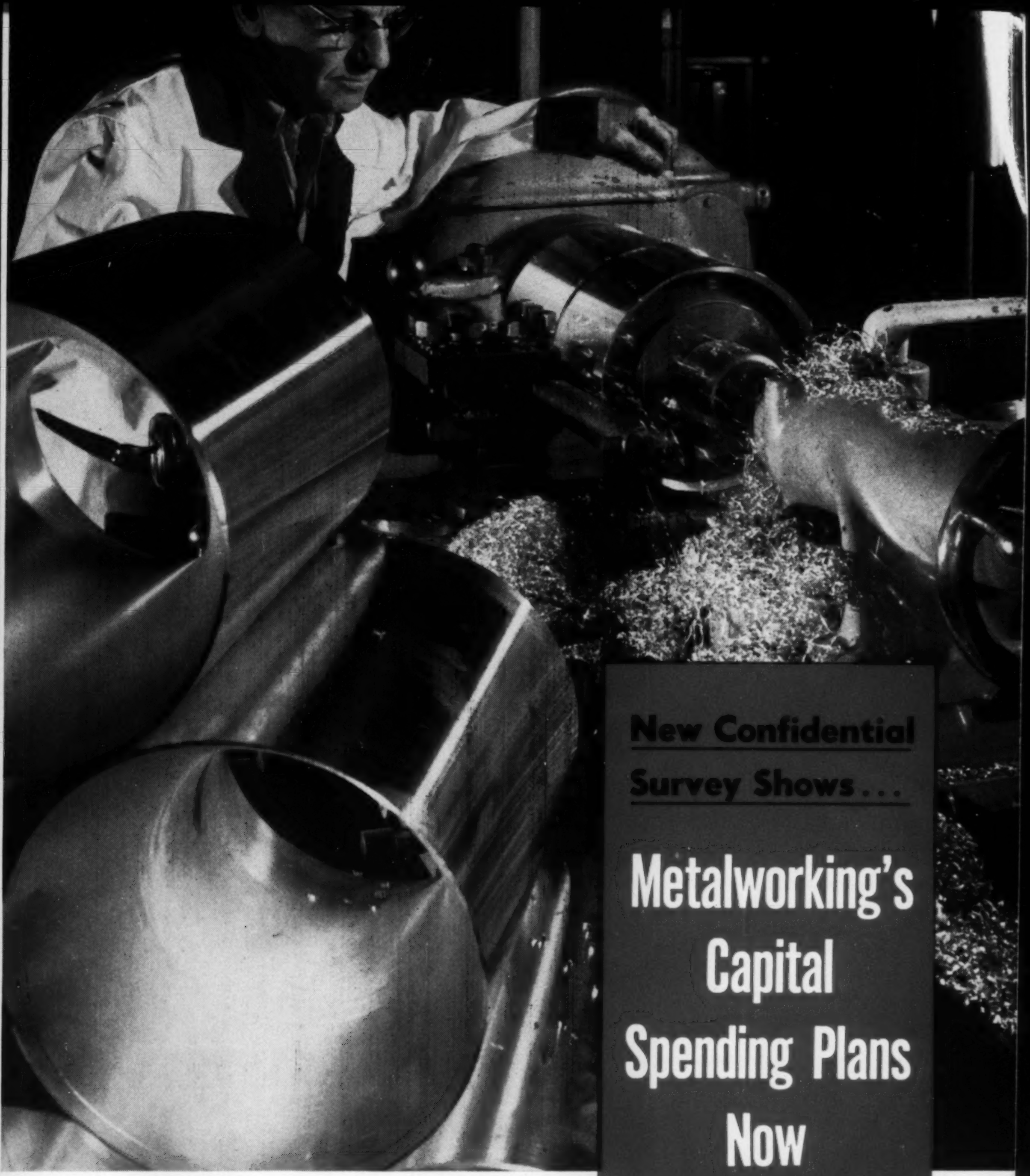
STEEL The Metalworking Weekly

A PENTON PUBLICATION

JULY 3, 1961



New Confidential Survey Shows . . .

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Get More Life from Electric Controls . . 54

Component Stocks Hold Steady 78

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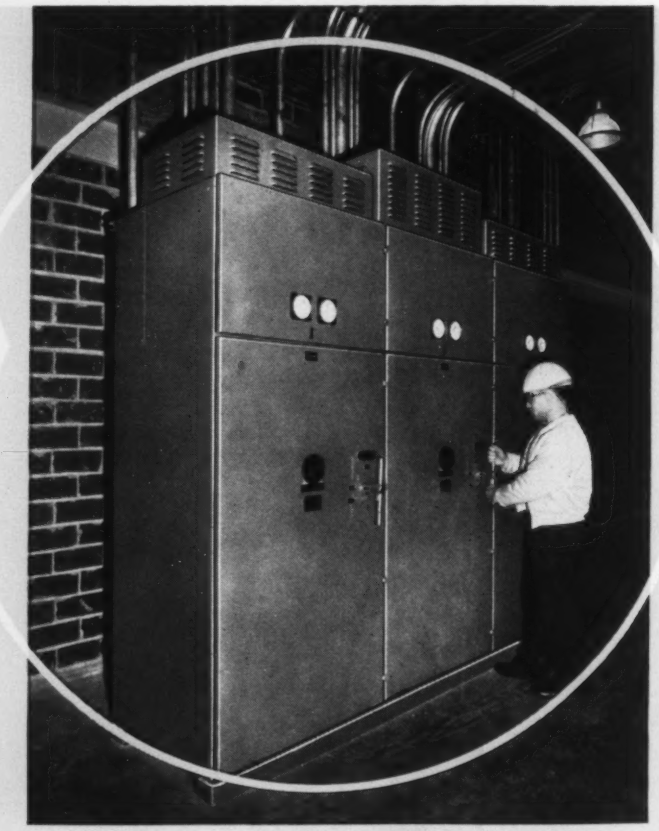
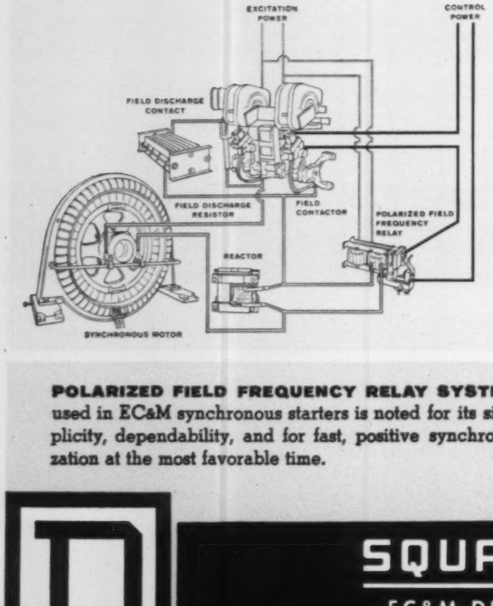
The Most Complete Synchronous Motor Protection you can buy!

- ***PUSH BUTTON START!***
- ***FULLY AUTOMATIC SYNCHRONIZATION!***



EC&M High Voltage Starters provide Simple, Safe Operation


EXCITATION POWER
CONTROL POWER
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FIELD DISCHARGE RESISTOR
FIELD CONTACTOR
POLARIZED FIELD FREQUENCY RELAY
REACTOR
SYNCHRONOUS MOTOR

POLARIZED FIELD FREQUENCY RELAY SYSTEM used in EC&M synchronous starters is noted for its simplicity, dependability, and for fast, positive synchronization at the most favorable time.

A push of the START button gives you complete motor protection, both starting and running—plus EC&M fully automatic synchronization! Motor windings are protected throughout the entire sequence. If the motor slows down, field excitation is automatically removed—the motor is permitted to re-accelerate—and resynchronization occurs automatically when the motor reaches the proper speed. Moreover, short circuit protection is available in both air and oil-break starters for any power system up to 5000 volts.

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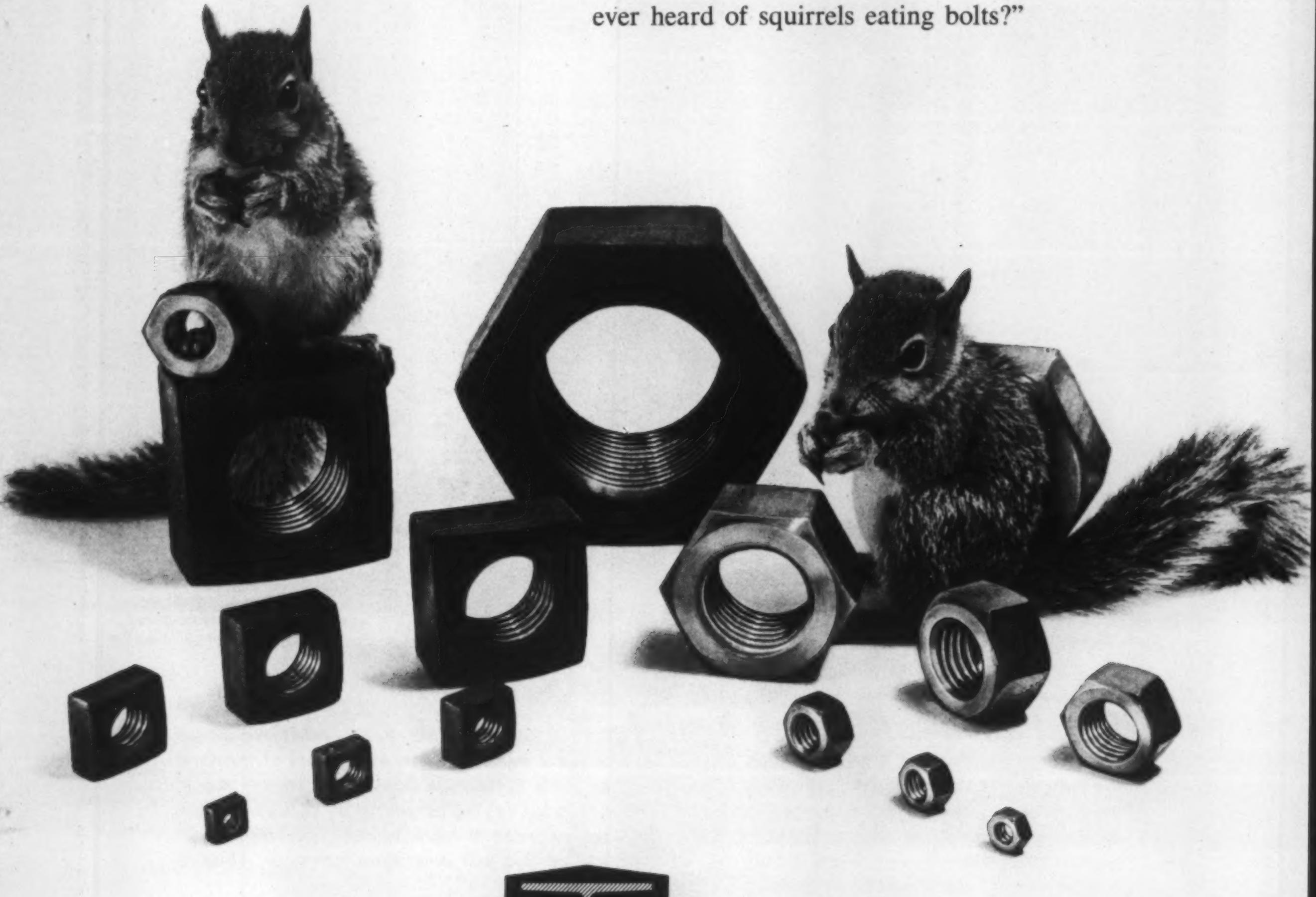
6329

PERCY: "Such an interesting variety of nuts. So well-made."

ALBERT: "And they all come from Bethlehem."

PERCY: "But where are the bolts?"

ALBERT: "Bethlehem makes those, too. But who ever heard of squirrels eating bolts?"



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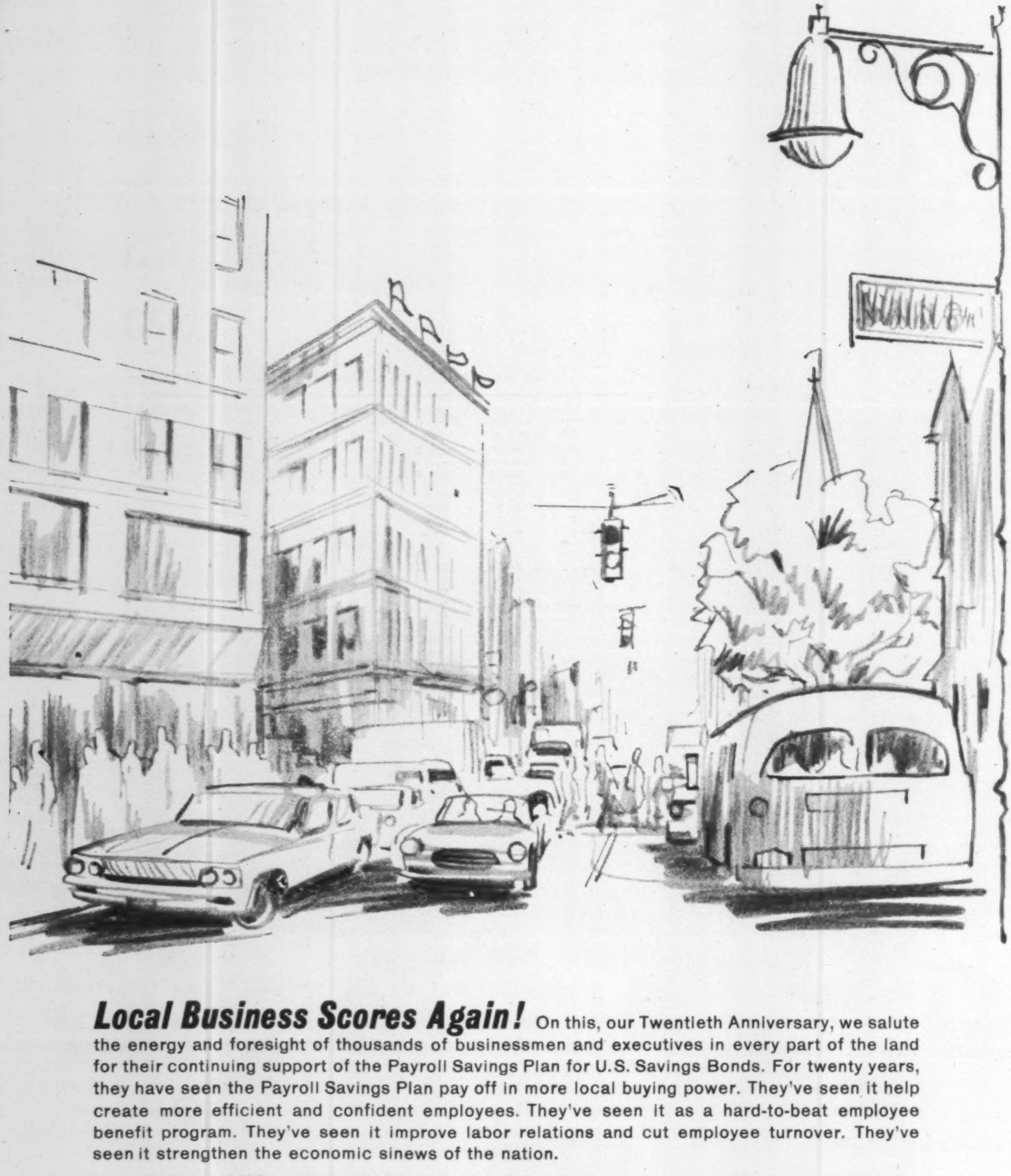
Steel *for Strength...Economy...Versatility*



Local Business Scores Again! On this, our Twentieth Anniversary, we salute the energy and foresight of thousands of businessmen and executives in every part of the land for their continuing support of the Payroll Savings Plan for U.S. Savings Bonds. For twenty years, they have seen the Payroll Savings Plan pay off in more local buying power. They've seen it help create more efficient and confident employees. They've seen it as a hard-to-beat employee benefit program. They've seen it improve labor relations and cut employee turnover. They've seen it strengthen the economic sinews of the nation.

How about you? Why not install this plan now or learn the many ways to improve participation in your existing plan. Send for complete brochure. Call your State Savings Bonds Director or write: U.S. Savings Bonds Division, Treasury Department, Washington 25, D.C.

20th ANNIVERSARY
1941 ☆ 1961

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20 Years of Service to America

STEEL

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YOU FELLOWS ARE RIGHT! ALLIANCE'S MAXIMUM PRODUCTION GUARANTEES US THE GREATEST OVER-ALL RETURN ON OUR EQUIPMENT INVESTMENT.

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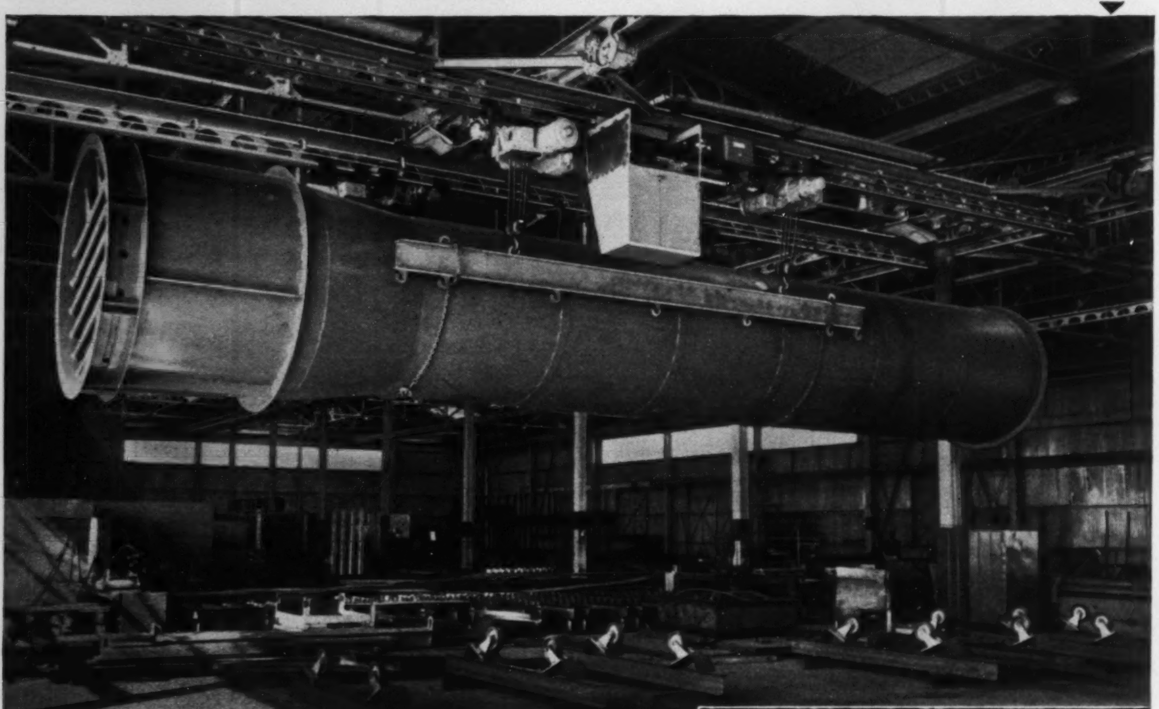
HUGE STACK HANDLED
with Light Tramrail Cranes

Two Standard Cleveland Tramrail Cranes Make Easy Job of Handling 11 Ton Stack

Two cab-operated Cleveland Tramrail cranes working together lift 11 ton stack. Each crane has two 5000 lb. electric hoists handling a spreader beam. Chains between the beams support the stack.

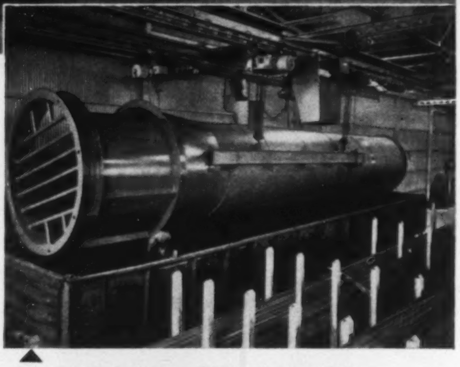


Cleveland Tramrail cranes are versatile in operation and offer handling advantages not normally possible with other forms of conveyance. They can be used to overcome difficult handling situations which occasionally arise and otherwise would be very difficult and costly.

The handling of a heavy stack made by Central Texas Iron Works Co., Waco, Texas, with two of their Cleveland Tramrail cranes, offers a good illustration. The cranes operate on the same three-track runway in one bay of the shop, are cab-operated and rated for five ton loads. Their principal function is handling large steel plates, bundles of reinforcing rod and various structural items.

The handling of the stack, nearly 50 feet long, weighing 11 tons, was not contemplated when the Tramrail crane installation was planned. Yet by working the two cranes together, the stack was easily lifted from the area where it was fabricated, moved a long distance in the shop high over various equipment on the floor and lowered into a gondola car at the end of the building. Despite the slight overload, the cranes moved the stack very smoothly.

For maximum materials handling flexibility, as well as efficiency, it will pay you to look into the possibilities of Cleveland Tramrail cranes.



The stack is lowered into the gondola car gently and accurately.

"WE ARE SOLD ON CLEVELAND TRAMRAIL"

Central Texas Iron Works writes:

"We are sold on Cleveland Tramrail because you build good equipment and because you are represented in Texas by a very fine dealer who is interested in helping us solve our material handling problems most economically rather than just trying to make another sale."

(May we add that all Cleveland Tramrail distributors have the same business philosophy).

Write for free booklet No. 2008

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STEEL

Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

July 3, 1961

Picture of the Times

Besides illustrating our feature article for the week, the cover photo reproduced in the accompanying cut shows the increasingly important role being played by capital equipment. The magnesium cylinder being machined will be the warhead for the Navy's air-to-air missile, Sparrow III. ACF Electronics Div., Riverdale, Md., of ACF Industries also makes the component for the Talos, Tartar, and Sidewinder vehicles.

The tolerance required is 0.0025 in., indicative of the precision demanded from today's capital equipment. For some of the economics that STEEL foresees for machinery during the second half, turn to Page 23 where our semiannual forecast begins.

Technological Displacement

Metal brassieres were an important product of the ancient Egyptian blacksmith. But he lost the job when metal spinning technique was developed—one of the first examples of job displacement for technological reasons in the metalworking industry.

STEEL editors will be citing modern examples of displacement in a big study coming up. More about that later.

Good Testimony

For an idea of the inventory situation in metalworking components, we suggest a look at Page 78. It's the latest installment in our quarterly survey on the subject, a series we have been running since 1952.

Assistant Editor Derry Eynon is doing quite a job with the reports, as attested to by A. G. Abramson, director of economic planning for SKF Industries Inc., Philadelphia. He says:

"We have analyzed the actual changes in bearing inventories compared with those anticipated by STEEL three months earlier. The direction of change has been correct in every instance. This seems an excellent record and indicates the material is useful for planning purposes."

Incidental Intelligence

Item: To make more colorful impressions, you can now get typewriter ribbons in eight colors—three shades of blue, two shades of green, two shades of brown, and a red—from IBM's Electric Typewriter Div.

Item: The machine may even displace the bartender. American Machine & Metals Inc.'s Auto-Bar Systems, Sellersville, Pa., has introduced a Cocktailmatic to mix fresh martinis and manhattans on the spot. It also counts your drinks on a meter and can be preset to serve dry, very dry, or very, very dry martinis.

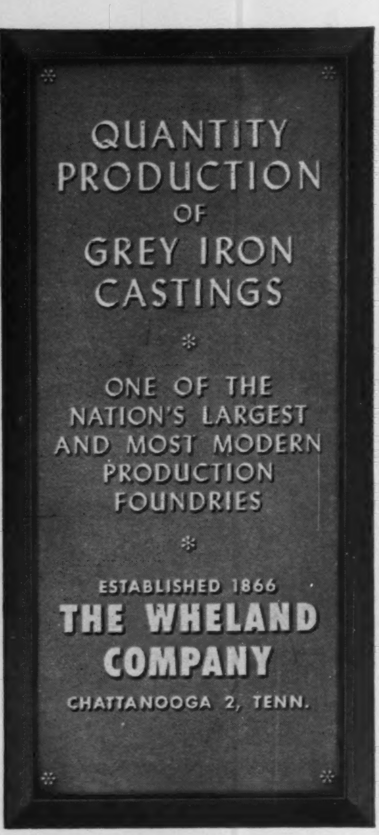
Magician

Metallurgical Editor Ed Case can palm a coin, hide a card, produce a rabbit, and turn out a fine story. For an example of his word magic, see Page 54. Ed's article tells how to get the most from electrical controls.

For an example of his avocational skills as a magician, we witnessed a demonstration in his office the other afternoon. We'll never again feel at ease with him in a poker game. Ed was inoculated with the magician's virus when he received a magic set on his 11th birthday. He became so skilled that he turned professional in his late teens. His earnings helped pay college expenses. Occasionally, he still performs professionally, but most of his shows today are impromptu. One of the tricks we like is with a deck of lexicon cards—they have letters of the alphabet on them.

Ed invites you to shuffle the deck, divide it into five roughly equal piles. Then, at his direction (but he never touches the cards), you follow a pattern of shuffling each pile and transferring cards from one group to another. When you end up, you turn over the top card on each of the five piles. Lo and behold! You have spelled STEEL.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.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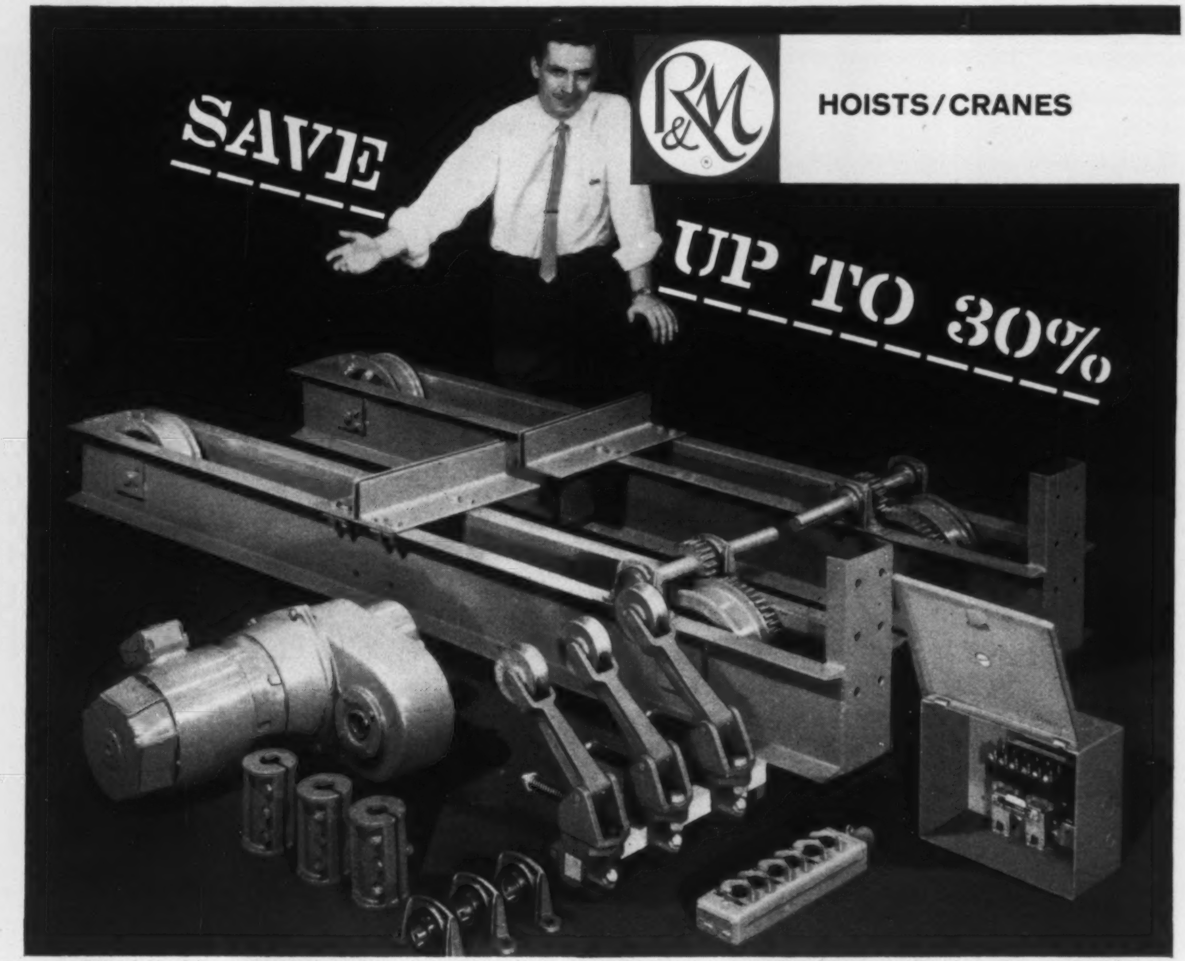

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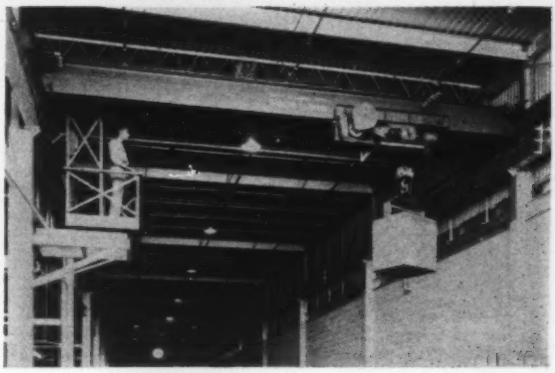
Now, save up to 30% by using R&M's new high-quality components to build your own rugged, hard-working crane in spans through 50 feet, capacities through ten tons! R&M supplies all parts, except structural steel and drive shaft (obtainable locally). Four types of end truck assemblies meet every service requirement—motor-driven or hand-geared operation, top running or underhung. Center drive assembly provides two gear reductions, motor, magnetic disc brake, choice of single or variable speed or accelerating fluid drive. Other R&M components include magnetic controls, cross shaft bearings and couplings, current collectors, push button station. Complete assembly drawings furnished. Write for Bulletin 900-5ST



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Don't blindfold him!

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The American Cancer Society grants millions of dollars for research on such projects as the study of viruses as a possible cause of cancer—the development of hormone treatments for cancer—the control of cancer by drugs. *Life-and-death projects.*

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AMERICAN CANCER SOCIETY

New Roebling Wide Width Tempered Spring Steel makes the most of a good thing

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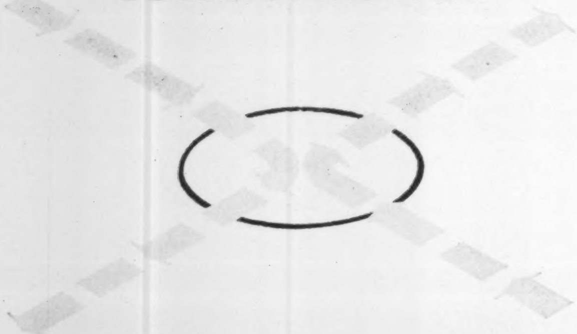
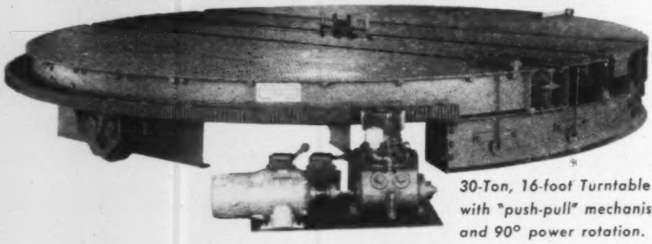


ATLAS turntables



30-Ton, 16-foot Turntable with "push-pull" mechanism and 90° power rotation.

Atlas turntables are made to customer specifications in any size and capacity; for manual or power rotation. Either flush or raised rail arrangement can be provided, with rail size and gauge to match existing track.

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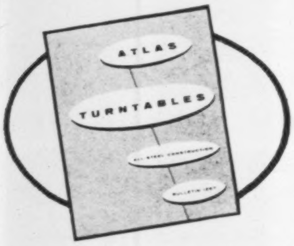

Bulletin 1297

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CALENDAR
OF MEETINGS

July 18-20, **Western Plant Maintenance and Engineering Show and Conference:** Pan Pacific Auditorium, Los Angeles. Information: Clapp & Poliak Inc., 341 Madison Ave., New York, or the San Francisco office, 681 Market St.

Aug. 15-17, **Cryogenic Engineering Conference:** University of Michigan, Ann Arbor, Mich. Conference secretary: K. D. Timmerhaus, Department of Chemical Engineering, University of Colorado, Boulder, Colo.

Aug. 16-19, **Society of Automotive Engineers:** National meeting, West Coast, Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, **Western Electronic Show and Convention:** Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Aug. 28-Sept. 1, **American Society of Mechanical Engineers:** International heat transfer conference, University of Colorado, Boulder, Colo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 10-12, **Steel Service Center Institute:** Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-12, **American Supply & Machinery Manufacturers' Association Inc.:** Industrial distribution conference, Statler Hilton Hotel, Cleveland. Association's address: 2130 Keith Bldg., Cleveland 15, Ohio. Business manager: W. B. Thomas.

Sept. 11-13, **American Mining Congress:** 1961 mining convention, Hotel Olympic, Seattle. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 11-15, **Instrument Society of America:** Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 12, **Society of Plastics Engineers Inc.:** Central Indiana regional conference on plastic tooling developments, Severin Hotel, Indianapolis. Society's address: 65 Prospect St., Stamford, Conn.

Sept. 14-15, **American Society of Mechanical Engineers:** Engineering management conference (ASME-AIEE), Hotel Roosevelt, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

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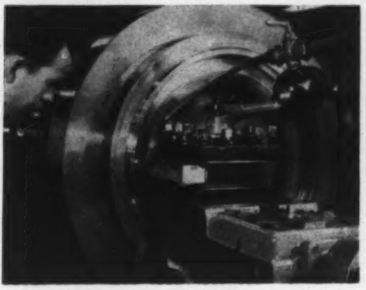
Metalworking Week®

July 3, 1961

Capital Equipment Spending: Set for a Rise



Metalworking now plans to order slightly more capital equipment during the second half than it did in the first six months, STEEL's latest confidential survey finds (Page 23). But many more orders could be unleashed if Congress enacted real depreciation reform, if business picked up considerably, or if the profit squeeze eased.

Four 'Firsts' Signal Better Business

Revenue freight carloadings in the week ended June 17 climbed above 600,000 cars for the first time this year, reports Association of American Railroads . . . Intercity truck tonnage in the week ended June 17 exceeded the total for the like 1960 week—the first time this year that has happened, notes American Trucking Associations Inc. . . . New business incorporations in May exceeded those of the year-earlier month for the first time this year, Dun & Bradstreet Inc. reports . . . National Coal Association reports bituminous coal production during the week ended June 17 rose above the like 1960 week for the first time this year.

National Tube Enters Structural Market

Henry J. Wallace, president of U. S. Steel Corp.'s National Tube Div., shows his firm's new square and rectangular hollow structural tubing. (The carbon steel product is hot rolled.) National Tube will produce and market a wide range of the tubing for architectural purposes. It can cut weight of structural members by 30 to 40 per cent, while maintaining strength, says the division.

Outlook for Tax Incentive Program Not Bright

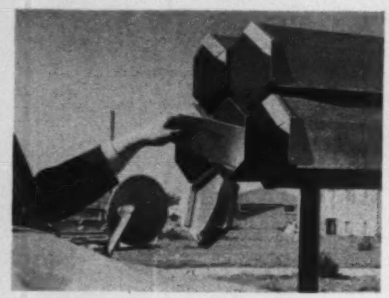
It's highly doubtful that industry will get any kind of help on depreciation during this session of Congress. STEEL talked with six members of the House Ways & Means Committee (which has been studying the Treasury Department's tax incentive proposal) and found them far from enthusiastic about the program's chances for passage. First, there is a considerable division of opinion in the committee, with some influential congressmen in both parties wanting to push for real depreciation reform, rather than Treasury's substitute. Also, as Rep. Jackson E. Betts (R., Ohio) told STEEL: "I am not too much impressed with the administration's position." During hearings, no one effectively backed up that stand. Rep. Thomas B. Curtis

Technical Outlook—Page 53

Market Outlook—Page 77

(R., Mo.) also would prefer real depreciation reform. He says: "We must modernize our tax laws to conform to modern economic reality." One committee member told STEEL the bill could possibly be reported out of committee (favorably by a close vote) by July 10, rushed through the House, and delivered to the Senate in time for action this session. But he said that if the bill were not out of committee by that date, there would be little hope for action this session.

Alcoa Names Winners of Student Design Contest



This new kind of mailbox, called the Mailagon, and this amphibian camping vehicle, called the Amphicamper, are items that won for their designers in the 1961 Alcoa Student Design Merit Awards. John Bowers Jr. of Pratt Institute designed the Amphicamper and Robert Taylor of the University of Illinois designed the Mailagon. Other winners: Charles Tipple of Syracuse University (a ski and pole carrier), Andrew Oakes of Philadelphia Museum College of Art (a zipper technique of fastening aluminum sheets), Marnie Averitt of Illinois Institute of Technology (a tiny electric car), and David Haas of the University of Bridgeport (an overhead utility transportation complex).

GE Stands Firm; Does Not Sign Consent Decree

At press time, General Electric Co. was sticking to its decision to face an open court trial rather than sign the civil consent decree the Justice Department has proposed as a followup to the price fixing cases. GE says the ban on unreasonably low prices asked by Justice is too vague. In Philadelphia, General Electric, Westinghouse, and Allis-Chalmers have asked the federal district court to dismiss the government's first civil damage suit growing out of the price-fixing convictions in the electrical equipment industry.

CO_2 Welding Gets 'Quality' Tag

Carbon dioxide welding promises to be one of the most versatile of all arc processes. And mechanical properties of such welds in stainless and low alloy steels are frequently better than their counterparts made with the submerged arc technique, or coated, manual electrodes. CO_2 shielded arcwelds also have greater resistance to hot cracking, the experts report. For a wrapup on current developments in the welding field, turn to Page 58.

Chicagoan Predicts Demand Spurt as Steel Price Hedge

A big spurt in steel buying in anticipation of a price increase will push steel business well beyond its present level by late summer, predicts Howard R. Conant, president, Interstate Steel Co., Chicago service center. He points out that a large segment of steel users expects a price hike, but he notes that "one alternative to a general price rise might well be selected price increases." Watch for STEEL's analysis of the pricing situation next week.

Five Ways to Counter Price Fighting

A National Industrial Conference Board survey finds these five steps are being taken by many firms to relieve the effects of price competition: 1. Better selling on a quality (and profit) basis. 2. More frequent customer contacts and a search for new markets where competition is not as severe. 3. Passing up narrow margin sales. 4. Reinforcing the company image as a leader and providing new, distinctive products. 5. Weeding out small accounts where service costs are excessive and reducing manufacturing costs wherever possible.

Three Industries Note Sales Gains; One Suffers Drop

Substantial gains in highways, commercial building, apartments, and electric utilities in May sparked a 5 per cent rise over a year ago in construction contracts, F. W. Dodge Corp. reports . . . May bookings of fabricated structural steel surged to a 17 month high, reports American Institute of Steel Construction . . . Factory shipments of gas water heaters in May rose 4.9 per cent above sales in the year-earlier month, says Gas Appliance Manufacturers Association . . . Sales of vacuum cleaners in May fell 9.3 per cent below those in May, 1960, reports Vacuum Cleaner Manufacturers Association.

775 kv Test Line Is Energized

A lineman on a ladder works with a decoupler used to isolate the three lines for radio influence measurements. On June 23, the lines were energized. Built by American Electric Power System and Westinghouse Electric Corp., this test line (at Apple Grove, W. Va.) transmits 775,000 volts of electric power, enough to supply a city the size of Philadelphia, A. C. Monteith, Westinghouse vice president, points out. He says the line "could carry more than 2 million horsepower, enough to pull a freight train 400 miles long."

ECM May Consider New Currency System

Die Welt, a leading German newspaper, reports that the Inner Six plan to discuss a new international system of currencies which would take over the functions of the gold standard, and that there is also talk of a joint monetary unit for the European Common Market. A common pool would be set up, into which member nations would deposit 10 per cent of their reserves. S. J. Rundt, New York consultant on international business, says such a move "may be a long way off, but it would be feasible." He likens it to the old

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Latin Monetary Union (1865 to World War I), which rendered the coins of France, Switzerland, Belgium, Italy, and Greece interchangeable.

More Help Coming for Exporters

The Office of Trade Promotion plans to set itself up as a central source for all government market data on foreign nations. The information will be indexed on IBM cards for accessibility. Result: You'll be able to get specific answers to questions on 36 different subjects for any country. Examples: Trade attitudes and habits in Mexico, packaging in Australia, personal selling in Nigeria, research programs in Israel. Officials tell STEEL the program may be in operation by yearend.

Straws in the Wind

By 1970, Arthur D. Little Inc. expects the average auto may contain 200 lb of aluminum (vs. 57 in 1960) . . . Science education beginning in kindergarten has been proposed by the American Association for the Advancement of Science . . . Lehigh University graduates this year received median starting salaries of $525 monthly, up 4 per cent from last year . . . Some 160 U. S. firms make nuclear measuring instruments designed for radiation detection or measurement, says the Commerce Department . . . About 1,161,000 civilians in the U. S. have hearing aids, reports the Public Health Service. That's 1 out of every 5 persons reported to have hearing impairments . . . The Export-Import Bank of Washington has authorized a $10 million credit to the Banco de Credito Industrial of Spain for the purchase of U. S. industrial equipment and services . . . Westinghouse Electric Corp. will supply electrical equipment for what is called "the world's fastest hot strip mill." The facility, at France's Usinor steel firm, will be ready in 1963 . . . A 2 per cent increase in rail carloadings during the third quarter (vs. 1960's third period) is predicted by the Association of American Railroads . . . Net working capital of U. S. corporations rose $1.8 billion during the first quarter to $134.3 billion . . . Personal income rose $2.5 billion in May to a seasonally adjusted annual rate of $413.5 billion . . . Housing starts in May totaled 127,300 units —up from April's 116,100 to a seasonally adjusted annual rate of about 1.3 million for the month.

Metalworking Pulse

The Business Trend: Despite slight declines for steel and autos, STEEL's industrial production index held to the 1961 high in the week ended June 24. Freight carloadings and electric output are still climbing seasonally. **Autos:** Makers are on the verge of model changeover, already started at Studebaker-Packard. Output will decline gradually over the next six or eight weeks. **Steel:** A sixth week dip in ingot output will accompany the July 4 holiday.

- **INDUSTRIAL PRODUCTION INDEX**

(1947-49 = 100)

Week ended June 24 . . .	**169†**
Year ago	**159**

Details on Page 43

- **PASSENGER CAR OUTPUT (UNITS)**

Week ended July 1 . .	**127,000***
Year ago	**125,868**

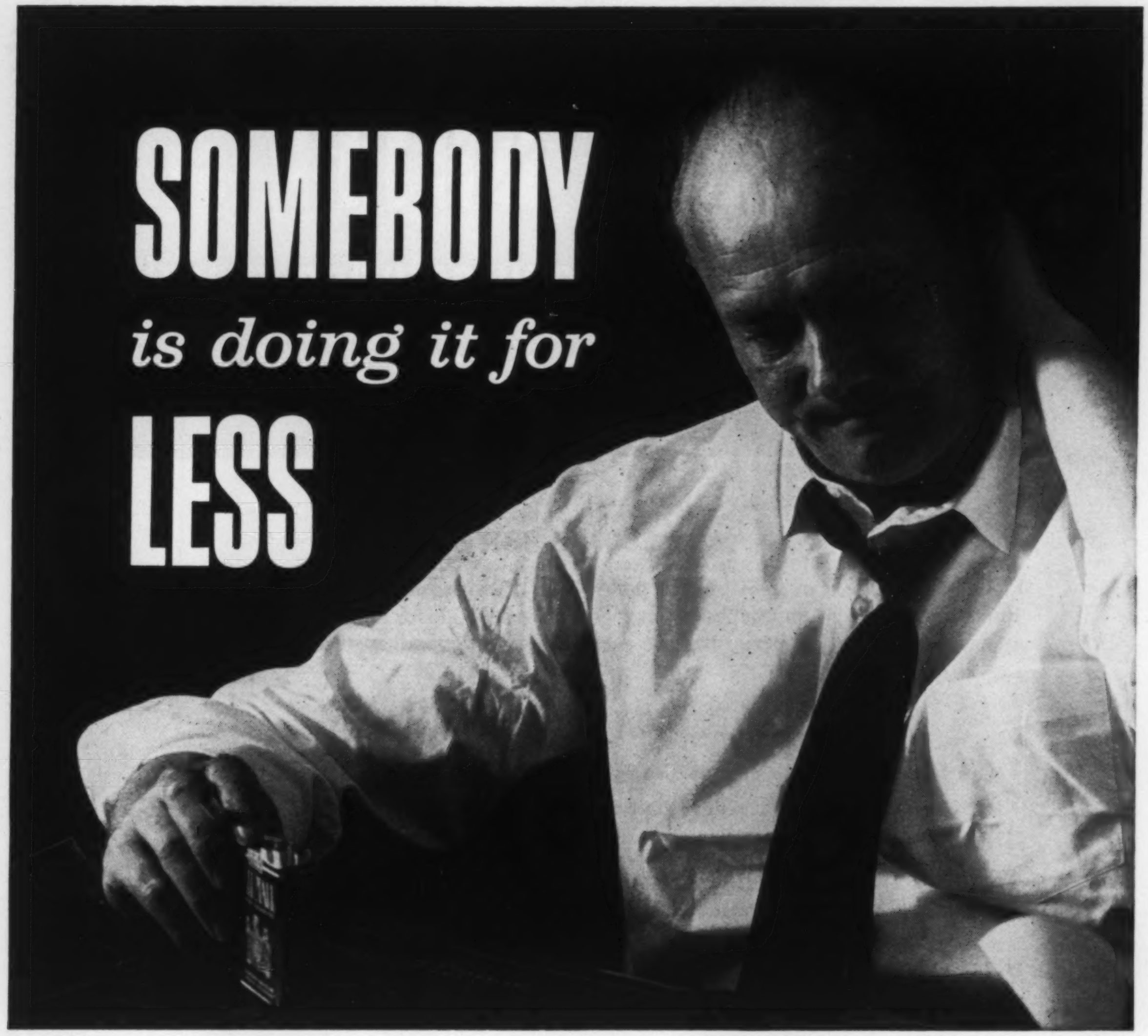
Details on Page 40

- **STEEL INGOT OUTPUT (TONS)**

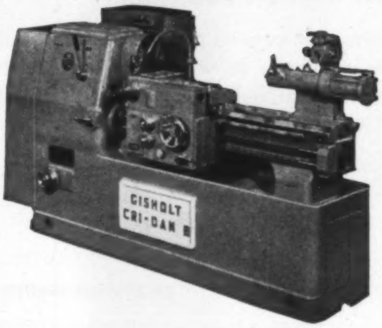
Week ended July 1 .	**1,970,000***
Week ago	**1,978 000**

Details on Page 80

†Preliminary. *Estimated.



SOMEBODY *is doing it for* LESS



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July 3, 1961

Plan for 1962!

Managers aren't doing enough planning for their companies, for their employees, and for themselves.

The obvious explanation is that the many factors affecting the future are so complex, so confusing, and often appear so remote that they defy analysis—or are ignored.

Yet many "known" facts are available for judicious planning. For example:

We know that the economy is heading toward a new boom in 1962. Treasury Secretary Dillon thinks gross national product may reach a new high of $555 billion vs. $514 billion in 1961.

We know there will be continuing labor difficulties (possibly a steel strike in 1962) and high labor costs.

We know that with the national debt limit close to $300 billion and possible tax cuts in 1962 there can be further inflation.

We know that the administration will keep on applying pressure to hold down prices and that there will be no respite from the cost-price squeeze.

We know that the U. S. will need to keep on spending close to $50 billion a year for defense—no matter what happens in Berlin.

We know that competition in a market that is now world-wide will become still fiercer.

Despite such facts, companies are giving too little attention to the development of new and better products, better marketing, better labor relations, and greater production efficiency.

Among the examples we have in mind are: The company that needs to completely revamp its products to stay in business; another that is having old machine tools rebuilt even though a competitor has bought new tools that are twice as fast; and another that admittedly has only skirted the edges of its foreign market potentials.

Those are only isolated examples of poor and inadequate planning.

What about your company?

If your planning isn't up to par, why not see what you need to do in 1962—as a starter!

Irwin H Such

VICE PRESIDENT-EDITORIAL

Republic Steel Lockers were selected by a leading West Coast manufacturer for their new wash-change-dress facilities. Republic Box Type Lockers on the outer wall are used for storing and protecting valuable employee tool kits. For complete planning and installation assistance, call your Republic representative, or write today.

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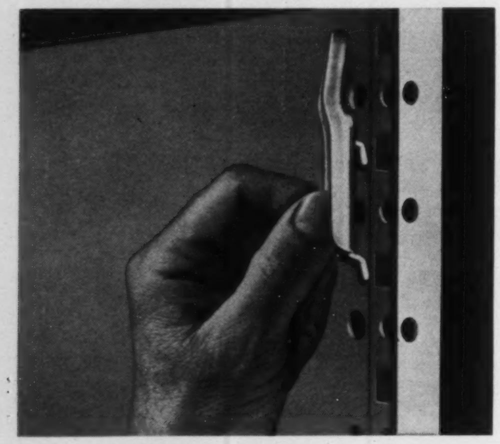

REPUBLIC METAL LUMBER® provides faster, stronger, safer framing in any application where common building materials are now used. Simply measure, cut, assemble. Stronger, safer—fabricated from cold rolled steel for high strength-to-gage ratio. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Send for attractive brochure.

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Good locker planning—attractive wash-change-dress facilities—pays-off in improved employee relations and increased production. And, good locker planning is easy with Republic Steel Lockers.

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Republic Steel Lockers are available in a wide range of sizes and styles with box type lockers attached or separate for protecting tool kits. Your choice of any of the popular locking devices.

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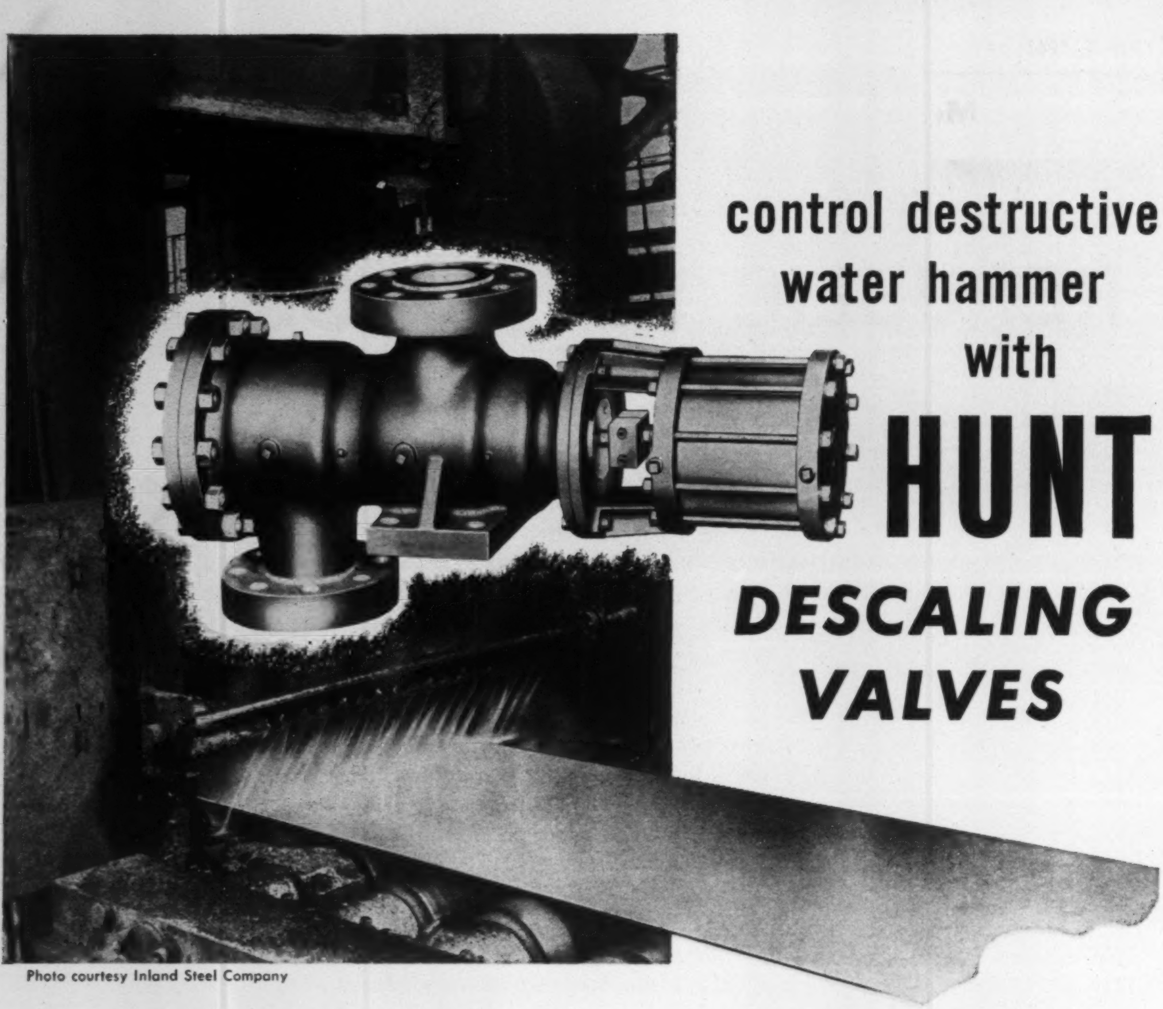

Photo courtesy Inland Steel Company

control destructive water hammer with HUNT DESCALING VALVES

In daily service in a majority of the hot strip mills throughout the world, Hunt accumulator shut-off and descaling valves provide years of dependable, trouble-free service.

Designed to reduce hydraulic shock and excessive maintenance, Hunt valves feature special porting and long piston travel . . . they open and close gradually, reducing water hammer in the system to an absolute minimum.

Dead shut-off conserves pump capacity . . . maintains full flow to working headers. Opening and closing speeds are easily controlled . . . pressure-balanced packing and corrosion-resistant materials assure long life. And, when maintenance finally is required, valves may be repacked in place. Ruggedly built of electric furnace cast steel, Hunt valves withstand highest working pressures and inherent system shock with ease.

Widely used also for hydrostatic testing, Hunt valves are available for pressures up to 2500 psi, in sizes from 2 through 8 in., separately or as part of a complete descaling system, including a completely automatic Hunt-built accumulator control panel.

Put Hunt's years of experience to work for you. Call your Hunt representative for recommendations while your system is still in the design stage. Or, write for more information, requesting Bulletin 517. Address Hunt Valve Company, Salem, Ohio, Dept. ST-761.

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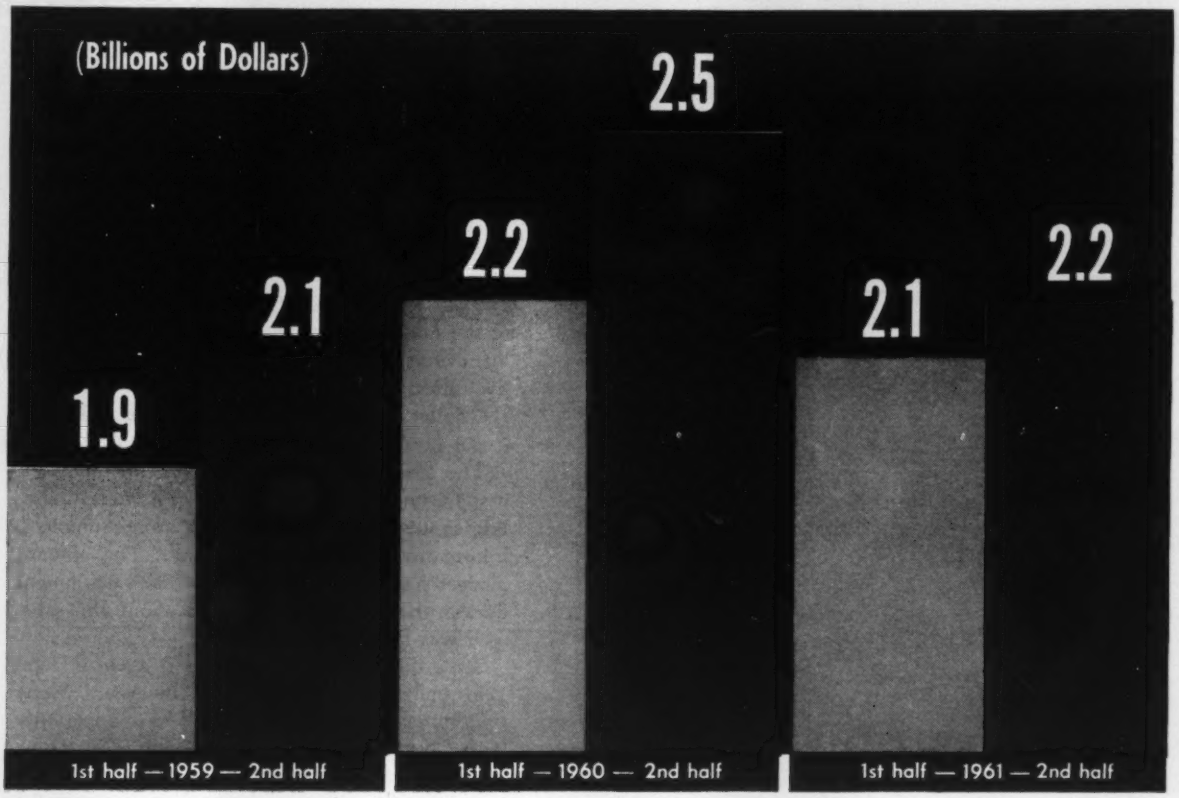


Metalworking's Orders for Capital Equipment

Capital Spending . . . Steady Now, Set for Rise

AT THIS TIME, metalworking plans to order slightly more capital equipment (in dollar volume) during the second half than it did in the first six months. But that ripple could suddenly swell into a wave if any one of three winds blows stronger:

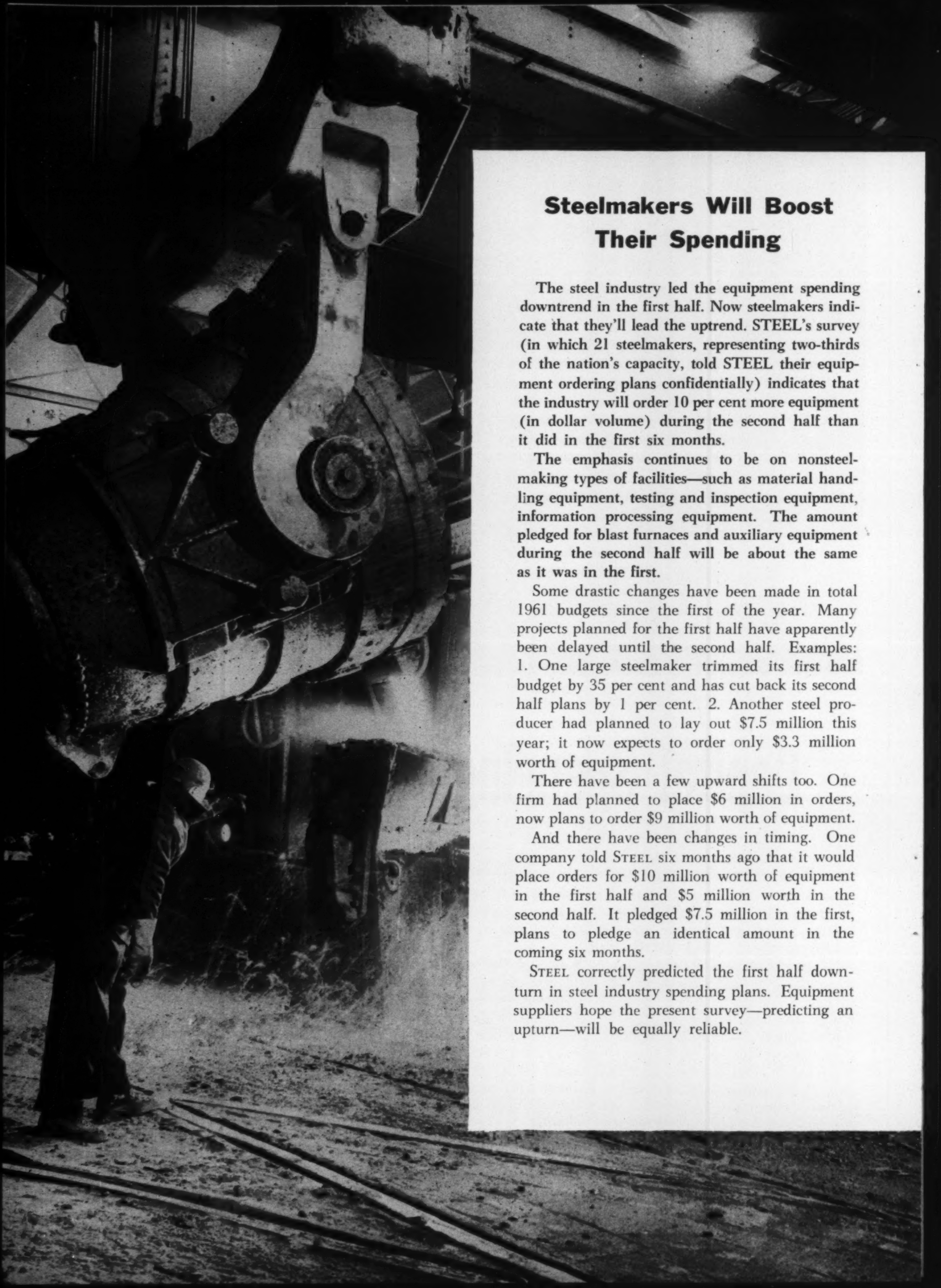
- Effective liberalization of depreciation laws by Congress would have a dramatic effect.
- A surge of confidence on the part of metalworking management (which seems to be developing slowly) would turn a lot of plans, now filed for future action, into orders for hardware.
- A sharper-than-expected profit uptrend would permit the unleashing of orders delayed earlier this year when it became apparent that lackluster profits were in store for the industry.

• **Lots of "Ifs"**—STEEL's latest confidental survey of the plants that purchase one-third of all the capital equipment bought by metalworking finds that the industry plans to order $2.2 billion worth of equipment during the second half. It's about 4 per cent more than the volume pledged during the first six months.

But numerous respondents hedged their statements. Said one: "We'll only buy one new machine tool—which we need badly—until we find out what Congress is going to do about depreciation reform. If the Surrey tax incentive is all that we're going to get, we'll delay most of our big projects in the hope that real depreciation reform will come next year, as the President has suggested."

Another respondent said his firm would place orders for $165,000 worth of equipment during the second half, adding that the figure "is only about half of what we should spend, but after the damned poor profits we had in the first half, this is all we feel we can afford. If business picks up rapidly, we'll reconsider."

A third noted: "I'll be happy



Steelmakers Will Boost Their Spending

The steel industry led the equipment spending downtrend in the first half. Now steelmakers indicate that they'll lead the uptrend. STEEL's survey (in which 21 steelmakers, representing two-thirds of the nation's capacity, told STEEL their equipment ordering plans confidentially) indicates that the industry will order 10 per cent more equipment (in dollar volume) during the second half than it did in the first six months.

The emphasis continues to be on nonsteelmaking types of facilities—such as material handling equipment, testing and inspection equipment, information processing equipment. The amount pledged for blast furnaces and auxiliary equipment during the second half will be about the same as it was in the first.

Some drastic changes have been made in total 1961 budgets since the first of the year. Many projects planned for the first half have apparently been delayed until the second half. Examples: 1. One large steelmaker trimmed its first half budget by 35 per cent and has cut back its second half plans by 1 per cent. 2. Another steel producer had planned to lay out $7.5 million this year; it now expects to order only $3.3 million worth of equipment.

There have been a few upward shifts too. One firm had planned to place $6 million in orders, now plans to order $9 million worth of equipment.

And there have been changes in timing. One company told Steel six months ago that it would place orders for $10 million worth of equipment in the first half and $5 million worth in the second half. It pledged $7.5 million in the first, plans to pledge an identical amount in the coming six months.

Steel correctly predicted the first half downturn in steel industry spending plans. Equipment suppliers hope the present survey—predicting an upturn—will be equally reliable.

How Order Volume Will Shift

**(Capital equipment ordering plans, by industries)
Percentage change, second half, 1961, vs. first half**

Primary Metals (S.I.C. 33)	Up 3%
Steelmakers (S.I.C. 3312)	Up 10%
Fabricated Metal Products (S.I.C. 34)	Down 8%
Machinery, except electrical (S.I.C. 35)	Up 8%
Farm Equipment (S.I.C. 352)	Up 18%
Metalworking Machinery (S.I.C. 354)	Down 2%
Special Industry Machinery (S.I.C. 355)	Down 27%
General Industrial Machinery (S.I.C. 356)	Up 32%
Electrical Machinery (S.I.C. 36)	Up 2%
Motors & Generators (S.I.C. 3614)	Up 7%
Electrical Control Apparatus (S.I.C. 3616)	Up 19%
Electric Appliances (S.I.C. 3621)	Down 5%
Transportation Equipment (S.I.C. 37)	Down 9%
Motor Vehicles & Parts (S.I.C. 3717)	Down 15%
Aircraft & Parts (S.I.C. 372)	Down 5%
Instruments, Related Products (S.I.C. 38)	Up 11%

Equipment to Be Ordered

Here are the percentage changes in the dollar volume of orders metalworking will place for various types of equipment during the second half vs. the volume pledged in the first half . . .

Machine Tools	+ 4%
Presses	− 9%
Material Handling Equipment	+ 2%
Heat Treating Equipment	+ 2%
Cleaning & Finishing Equipment	+ 5%
Joining & Assembly Equipment	+12%
Testing & Inspection Equipment	+ 7%
Plant Service Equipment	− 8%
Foundry Equipment	+ 2%
Office Equipment	−14%
ALL CAPITAL EQUIPMENT	+ 4%

to authorize some other big projects as soon as Congress gets off its collective duff and gives us real depreciation reform instead of that hodgepodge proposed by the Treasury Department."

- **Tax Change Effect** — Congressional action to modernize the nation's antiquated federal depreciation laws would give the capital spending trend a decided upward push. A Steel survey of 1175 metalworking companies (see Steel, June 19, p. 47) discovered that capital outlays would climb 5.7 per cent during the next 24 months if "effective liberalization of depreciation laws" came to pass.

That means the industry would spend, over the next two years, $550 million more for capital equipment than it presently plans to shell out. And that is only the boost that would come from the 52 per cent of plants which now say they would hike their spending. It doesn't include any increases that could come from the 40 per cent of plants which say depreciation reform would not cause them to increase spending, or from the 8 per cent of plants which are undecided.

Add to that spending boost the increases which would be generated in other industries where such tax changes are badly needed (such as chemicals, printing, textiles, and mining) and you can easily see the tremendous lift that depreciation reform would give to the phlegmatic U. S. economy. The speedup could be sharp enough to generate a capital spending spiral.

Metalworking managers point out that the Treasury Department's tax incentive proposal falls far short of providing any real incentive for investment in modern equipment. One man calls the plan "tangled taxmanship." Others doubt the political advantage of the move, since probably no action by the Kennedy administration has received more criticism from businessmen—and the move has caused no marked reaction for or against in most other quarters, including organized labor.

Steel's surveys seem to prove that, if the federal government really wants to "get this nation moving again," rapid action on real depreciation reform would be an excellent ignition key.

- **Confidence Would Help**—An acceleration of new orders for durable goods, which appears to have already begun, would most likely lead to an upward revision in equipment buying plans. In a period of recovery, industry tends to underestimate its outlays for equipment, revising plans upward as the months pass. That happened in 1955 and, to a degree, in 1959.

Several of the managers who cooperated in Steel's survey noted that an upturn in their business could lead them to adjust their ordering plans upward. For example, an auto supplier reported: "This company would like to replace several technologically obsolete machines, but we'll not do that until we're sure that our volume will be sufficient for us to take care of the addition to overhead that new machines would mean. Our old units are completely written off."

Another general manager noted: "We plan to automate several operations, but doubt that we'll place orders during the second half. We want to be sure first that volume will continue high enough to support automation."

A foundry manager reported: "Our requirements may change. Securing a new customer may necessitate a quick change in equipment plans and additional machines required as rapidly as possible."

• **Profitlessness Hurts**—Metalworking's undesirable first half profit picture is also playing a notable role in the industry's equipment ordering trend. Many plans were shelved during the first half; full-year budgets were cut in a number of cases (see steel industry examples on Page 24).

If the profit picture brightens—a STEEL survey of business prospects predicts net profits will advance 4 per cent in the second half (STEEL, June 26, p. 29)—you can expect some improvement in the volume of new equipment ordered during the next six months.

• **Who'll Benefit?**—STEEL asked the survey respondents what types of equipment they will order in the coming six months. While such plans are highly subject to change, they do provide indications since, in most cases, they represent needs that the plants plan to fill at this time.

• **Machine Tools** — Metalworking now plans to order 4 per cent more metal cutting machine tools (in dollar volume) during the second half than it did in the first six months. That would give the machine tool industry a domestic order volume of about $375 million for 1961 (vs. $352 million in 1960).

But the machine tool industry would likely be the one most affected by depreciation reform legislation or a general business upturn. So second half budgets could be revised upward substantially if metalworking business improves or if Congress enacts effective depreciation changes.

There are dramatic changes—both up and down—in order plans. A large Michigan firm best exemplifies the shifts downward: It pledged itself to purchase $4.4 million worth of machine tools in the first half, but will place orders for only $500,000 worth in the next six months. Typical of upward shifts: An Indiana company ordered $1.5 million worth of machine tools in the first half and will order $2.7 million worth in the next six months.

• **Presses**—Plans now call for metalworking to pledge 9 per cent less for presses during the second half than it did in the first. The biggest second half program reported to STEEL will be undertaken by a steel producer. Here again, depreciation reform could spur an order uptrend. So could an improvement in the profit picture because many firms find it easier to hold off on buying presses than some other types of equipment.

• **Handling Equipment** — STEEL's survey finds that metalworking will place orders for 2 per cent (in dollar volume) more material handling equipment during the second half than it did in the first. Few giant programs are planned.

• **Joining, Assembly** — Makers of welding, brazing, fastening, and other types of assembly equipment will get a boost of 12 per cent in incoming orders during the second half, STEEL's survey indicates. Several companies report large programs in this area will be firmed up during the next six months.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

U. S. May Back Modernization Loans

THE LATEST approach to re-equipping U. S. industry to meet foreign competition may be government guarantees of loans for capital equipment investments. Such programs are reportedly in effect in Germany and France.

The government would set up, with Congressional approval, a plan like the Federal Housing Administration's home building loan guarantee program.

Under it, a firm planning to spend $100,000 on capital equipment could borrow up to 80 per cent with the government guaranteeing the loan for the private lender. A company would probably be limited to $5 million in loan guarantees at any one time. Loans under the program might add up to more than $1 billion.

• **No Cost to U. S.**—Administration sources point out the program will not involve any government loans or spending. With that pitch, they hope the program will move through Congress easily. It will be argued that the loan guarantees are necessary for "medium sized" firms too small to tap the public markets, but too big to take advantage of Small Business Administration financial aids. However, the program would not be limited to "medium sized" firms because it would be tough to establish rigid definitions and administer them.

To avoid any cost to the government, a 1 per cent premium would be charged on the guarantees. Interest rates would be set 0.5 per cent above the government borrowing rate. Loan terms would be seven or eight years.

• **Request for Your Comments**—The program has been discussed in government circles for at least two months. The wraps have been kept on it while data were being gathered to prove the need for this sort of help. That work is about finished. Administration sources tell STEEL they are ready to receive comments from industry on the idea. STEEL will be happy to pass along readers' comments to the proper administration source.

Small Firms Eye Overseas Business

SMALL FIRMS exploring the profit opportunities of foreign business can expect a helping hand from the federal government. They can also benefit from the experience of top managers for small firms who have developed successful international businesses.

Those points were emphasized last week at American Management Association's International Division briefing session.

Sen. Jacob K. Javits (R., N. Y.), who described legislation introduced in the present session of Congress to aid smaller companies in developing export markets, cites these requirements for doubling our exports (to $40 billion a year) by 1970:

1. We must be prepared to take our share of imports.

2. We must open up export opportunities to the smaller U. S. businesses as well as to the larger ones. One of the surest ways to do this, he says, is to have a complete program of export credit guarantees, issued by the Export-Import Bank of Washington.

3. We must enlist the co-operation of Western European trading partners in keeping open and widening their markets for U. S. products and those of other Free World nations—especially Latin America.

How 208 Companies Operate Abroad

AMA surveyed 327 firms and found 208 engaged in some form of foreign business. Of these:

201 do some exporting.

70 report licensing (some crosslicensing) arrangements.

35 have wholly owned subsidiaries.

8 are in contract manufacturing.

28 report one or more joint ventures.

4 have holding companies abroad.

- **More Help from BFC**—John C. Borton, acting director, Bureau of Foreign Commerce, Department of Commerce, states his department is giving increased emphasis to the promotion of exports. Expanded services for businessmen include:

- Bulletins, statistics, and reports on export opportunities. (Contact the bureau in Washington or any of the 33 local offices.)
- Trade lists that show names of established foreign companies and give market potentials.
- Market surveys for U. S. companies performed for nominal fees. A trade contact survey costs $10. Nearly 1000 were made last year, almost that many so far in '61.
- World trade directory reports (brief analyses of foreign firms) cost $1.
- A business proposal system offered by the bureau under which trade missions open negotiations for you with foreign companies.
- Trade mission public meetings held in this country when team members return from visits abroad.
- Establishment of trade centers abroad as a showcase for U. S. products. The first center, featuring housewares, opened in London last month.
- Trade fairs—at the recent fourth Tokyo International Trade Fair, 20 U. S. exhibitors booked $3,079,315 in sales, Mr. Borton relates.
- In Washington, a "one stop service" is maintained by the bureau's Business Relations Division. Meetings with proper government officials will be arranged for businessmen.

Richard G. Lurie, publisher, American Exporter Publications, New York, said a survey of 130 combination export management firms last year showed the companies handled $387 million of exports for 2300 small manufacturers in the U. S. "If it hadn't been for these export firms, I doubt these manufacturers would have been in the export business at all," he said. He estimates that the export firms account for about 8 per cent of all U. S. semifinished and manufactured exports.

The combination export manager, he points out, can consolidate materials from several factories in one shipment—and one ocean bill of lading.

- **Survey**—Profitability was a factor stressed by small firms replying to AMA's survey (see above). Several executives declared that foreign business during 1960 made the difference between a fair profit and a loss for their firms.

The volume of foreign business reported by the small firms varied from less than 1 per cent of sales to more than 20 per cent; the median was 3 to 5 per cent.

Price Fixing Charged

SIX MANUFACTURERS of transmission line hardware have been indicted on price fixing charges.

A federal grand jury at Milwaukee named these defendants: Oliver Electrical Mfg. Co., Battle Creek, Mich.; Utilities Service Co., Allentown, Pa.; Hubbard & Co., Chicago; McGraw-Edison Co., Elgin, Ill.; Joslyn Mfg. & Supply Co., Chicago; and A. B. Chance Co., Centralia, Mo.

What Goldberg Can Do to Influence

POSSIBLE ACTION	SIGNIFICANCE
● **Use the Federal Mediation & Conciliation Service.**	FMCS people have been on the job talking with both sides for weeks. Director William Simkin would enter the talks at the first sign of a major breakdown in negotiations.
● **Use the influence of the President's Advisory Committee on Labor-Management Policy.**	The July meeting is scheduled to cover wage and price policies. A statement on the need for "restraint" by both management and labor can be expected July 11.
● **Use his personal influence on labor.**	Messrs. Goldberg and Reuther can't be called "close" friends, but the secretary's office and knowledge of union affairs will weigh heavily in any moves made by the auto chief.
● **Seek help from other cabinet members to influence management.**	Defense Chief McNamara (ex-Ford president) and Commerce Secretary Hodges (an ex-businessman) will advise auto executives that this isn't the time to make an enemy of the Kennedy administration if a strike can be avoided.

THE PRESSURE is on Arthur Goldberg to maintain labor peace in the auto industry this summer, and he knows it.

He has already publicly warned labor and management that the Kennedy administration will not tolerate an auto strike this year. Agents of the Federal Mediation & Conciliation Service (FMCS) moved into the arena earlier than ever this time to see how both sides were regarding the upcoming negotiations: A steady stream of reports has been coming back to Washington, where Director William Simkin of the FMCS keeps the labor secretary up to date.

Secretary Goldberg, in turn, talks directly to the President, who has given the ex-Steelworker lawyer, and father of the AFL-CIO merger, almost a free hand in national labor matters.

The secretary has exhibited his ability to settle tough labor-management tussles: A barge strike was avoided in March by the simple, but tough-to-sell tactic of putting off any settlement for a year—until the situation could be reviewed. The secretary moved into the jurisdictional fight between the pilots and flight engineers of the nation's airlines by advising the President to set up a three man panel to investigate. He went to New York as soon as it became obvious a national shipping tieup was coming. The action was followed up last week when President Kennedy invoked the Taft-Hartley Act and set up a three man board to investigate the dispute in the merchant fleet strike.

• Rocking the Boat—Secretary Goldberg views the auto negotiations with these political facts of life in mind:

1. The economy has recovered from the recession; an auto strike would rock the boat. Conceivably, it could persuade businessmen to pull back their capital spending plans and slow down the recovery. (It is axiomatic among members of the Council of Economic Advisers that the recovery will not be complete until capital spending plans turn up sharply.)

2. Given full recovery from the recession, the administration may be able to offer the public more welfare legislation and a tax cut—possibly next summer. Officials have estimated a $5 billion surplus in the fiscal 1963 budget.

• Selling the Idea—As UAW President Walter Reuther pushes for an oversized wage package and the industry replies that it can't afford any direct wage increases, the labor secretary will inject these points

the Auto Negotiations

POSSIBLE ACTION	SIGNIFICANCE
● Ask the President to name him special fact finder, or establish a labor-management-public fact finding group.	This drastic step would put the weight of public opinion on the auto industry (as ex-Labor Secretary Mitchell's fact finding job did during the last steel strike). It would come just before a walkout was scheduled.
● After reporting to the President on the "facts" of the dispute, he could recommend that both sides consent to arbitration.	If this occurred in December and arbitration was refused, the President would be ready to speak out at press conferences and other public events.
● Threaten the use of the Taft-Hartley Act.	The law says the President can appoint a board of inquiry which can conduct hearings, then recommend that the attorney general seek an injunction against a threatened strike which would "imperil the national health or safety."
● Speak publicly.	In Detroit, he told auto and union leaders a strike would be "intolerable."

into the bargaining:

- The auto industry faces increased foreign competition.
- An auto settlement that is too high could touch off an inflationary wage spiral throughout the hundreds of smaller shops in related industries and lead to unreasonable Steelworker demands next year.
- A shutdown in autos would be regarded as an excuse by conservative congressmen for further legislative interference in the collective bargaining process.
- Public opinion would be solidly against a strike because more than 100,000 autoworkers are unemployed.
- The administration, counting on a union man to keep labor in hand, might turn more conservative if it felt the union were doublecrossing it.

Those points add up to putting the administration on the side of management's desire to hold the wage line. Realists in Washington see the President going that way because of his insistence on getting the economy "moving again." Although the administration owes labor a political debt, it will support its action arguments with the union with these New Frontier doctrines:

- A growing economy is necessary to sustain increased needs for welfare legislation.
- Full employment (actually 4 per cent unemployment) must be achieved as rapidly as possible.
- Price stability must be maintained on U. S. products to meet foreign competition.
- Personal and corporate taxes must be cut.

White House sources think an auto strike could trigger a series of national strikes. The President is fully aware of the tendency of unions to play follow the leader when a victory is scored at the bargaining table.

• Productivity and Prices—Treasury Secretary Douglas Dillon warned in June that labor and management must recognize the overriding importance of "the national interests" in labor negotiations. Management must avoid "large administered" price increases; labor must keep its wage boost requests to what increased productivity allows.

The Justice Department's hard-nosed campaign against violators of antitrust laws is offered to labor as evidence of the administration's sympathy for the working man. Secretary Goldberg will tell the Autoworkers that they, in turn, must hold down their demands on management.

• Settlement Terms—The Council of Economic Advisers is at work on small scale studies of the steel and construction industries to evaluate relationships among prices, productivity, and wages. That is a tipoff to the way the administration will handle possible labor disputes. The facts will be at hand to argue (privately or publicly) for the desirability of settlements.

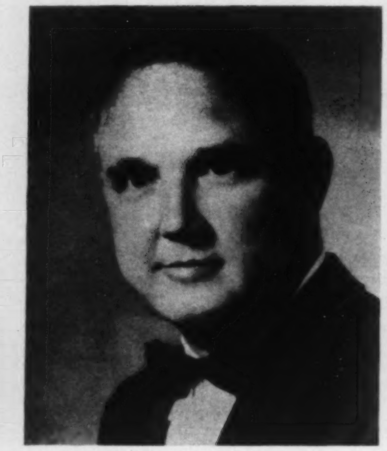
If the need arises, look for Secretary Goldberg to use the "fact finding" approach in the auto negotiations. He probably couldn't delay a walkout for a year, but public opinion would probably be on his side if he asked for a 90 day cooling off period while gathering "facts."

The best guess on a settlement that would meet the administration's approval: A token direct wage increase, with the emphasis upon fringe benefits, a package of no more than 6 or 7 cents an hour per year.

Economic pressures usually dictate a settlement, but the government's role is permanent because of the relation between the large basic industries and the welfare of the national economy. Even if the secretary doesn't go to Detroit, his influence at this summer's talk will be felt.

Sums up a union source in Washington: "Walter doesn't want a strike, but he will sure threaten one to get Arthur to Detroit. Then, if he gets a bad deal, he can blame Arthur."

John J. Rhoades
Arizona



Thomas B. Curtis
Missouri

Perkins Bass
New Hampshire

Automation-Unemployment Hassle Brews

LOOK FOR the House Republicans, led by the men above, to stage a series of attacks on President Kennedy's economic policies between now and the end of July.

A Republican task force, 48 strong, calls its venture "operation employment." Representative Curtis, recognized as the young Republican leader on economic policy, kicked off the campaign last week with a speech from the floor which outlined the group's intentions. It will seek to prove:

1. Technological growth creates more jobs than it obsoletes.
2. Government does not create jobs—private industry does.
3. The price of rapid technological growth may be some economic dislocation, but stopping the pain might result in killing the patient.

Speeches of task force members will be based on special studies done for the House Republicans by a group of 25 economists representing leading universities and economic study groups in the country. Representative Bass heads a special automation subcommittee.

Sums up Congressman Curtis: "We will present a summation of how employment can be properly handled in an ever growing economy so that people will be meaningfully employed at higher pay and higher skills. Demand for new skills will be met, and we will move the economy on to greater records."

● **HOLLAND REPORT SUGGESTIONS**—On the opposite side of the aisle, the automation subcommittee headed by Rep. Elmer J. Holland (D., Pa.) issued its final report after weeks of hearings on technological unemployment. Its recommendations:

1. Qualified unemployed should be assisted in getting more training.
2. The U. S. Employment Service (U.S.E.S.) should be beefed up to spread more information about employment faster.
3. U.S.E.S. counseling services should be expanded.
4. The Bureau of Labor Statistics (BLS) should receive more funds for statistical work on the types of unemployment, what industries the unemployment occurs in, and the geographical location of the unemployment.
5. BLS should conduct special studies on the mobility of labor.
6. Businessmen should report (to the Labor Department) technological advances which may tend to increase unemployment.
7. The government should make an all-out effort to encourage greater mobility of the labor force.

The Holland report is generally regarded in Washington as striking the middle ground between Republican and Democratic economic philosophies. The subcommittee does not blame industry for encouraging automation; the group sought suggestions for positive action to alleviate the problems resulting from automation.

The lone committee member to abstain from signing the report was Rep. Donald C. Bruce (R., Ind.). The congressman suggested that no "sound" legislation could be forthcoming from the hearings because no "pattern" of the effect of automation on unemployment was discovered by the subcommittee. Representative Bruce suggests: More freedom for private enterprise will allow the economy a faster rate of growth and will tend to solve most intermediate problems.

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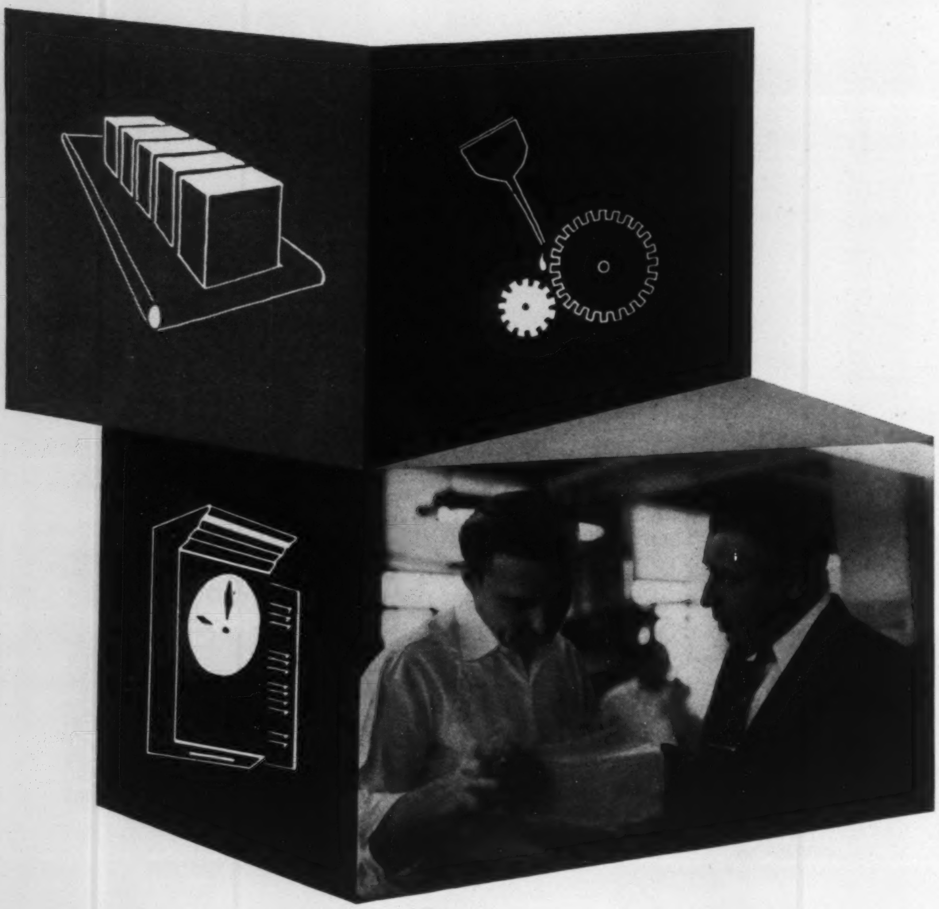

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CREATE FOR PROFIT GROWTH

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PROFIT GROWTH

MORE THAN 50 years ago, U. S. Electric Light Co. exiled its most creative spirit, Hiram Maxim, to England on a $20,000 annual life pension. The reason: He was thinking up developments at such a rate that old equipment was being rendered obsolete before it was paid for. He achieved some of his greatest accomplishments in England, and while he was being knighted for them, the firm that banished him was going out of business.

No U. S. company would be so foolish today—or would it? Corporate techniques for banishing the creative spirit may merely be subtler now.

"Yet the firm that does not have an alert, eager, research-conscious, far-sighted management is courting disaster," warns Dr. Walter Buckingham of Georgia Institute of Technology. "In the nineteenth century, if you were 30 years behind the times, it didn't matter much because the times weren't moving very fast. Now to be 30 months behind the times is to be far more obsolete."

The only way for a company to keep pace in 1961—and the corollary of that, the only way for a company to maintain profit growth—is through creativity. And that means far more than creativity in the conventional sense of research for new products. It means a creative approach to marketing, accounting, packaging, manufacturing, and all the other phases of a business.

Metalworking's Dilemma

"Future increases in productivity will continue to depend primarily on combinations of technological, economic, and administrative or

managerial innovation," affirms O. A. Ohmann, director of employee relations for Standard Oil Co. (Ohio). However, he adds, as industrial organizations grow in size they become more formally structured, more standardized in their operations. More time and energy will necessarily be devoted to the co-ordination, maintenance, and service of the organization itself. "Resultant power centers and the rigidities established to support them are natural enemies of the creative spirit. Size itself puts a premium on administrative skills. The managerial function tends to gravitate from the innovators to the co-ordinators."

The recognized genius of big business has been its productive efficiency. Its management has developed great skill in co-ordination and execution. Through research and engineering, it has improved, adapted, perfected, and extended services and production. But with true innovation, the record of the big corporation is not so impressive. Example: Of all the household appliances, the garbage disposal unit is the only one invented by the large appliance makers.

We have to have the authoritarian side of management to get out the production efficiently, to keep standards, and to organize the increasingly complex aspects of industry. That tends to stifle creativity, which we must also foster. How are we going to make the best of two worlds?

How to Build Creative Management

WHAT makes one firm more progressive or more profitable than another?

"There is a common denominator among leadership companies—I call it 'creative management,' " says George S. Dively, chairman and president of Harris-Intertype Corp., Cleveland, maker of printing equipment and electronic products. Under his direction, the corporation has increased its net shipments from $21.7 million in fiscal 1951 to $74 million in fiscal 1960, its net earnings from $2 million to $5.7 million, its assets from $16.8 million to $56.9 million.

To build creative management, he suggests:

1. Defining company objectives.
2. Cultivating new ideas.
3. Developing management people.

● **Define Objectives**—You need a clear policy and a plan, says Mr. Dively. "Besides knowing where you're going, you must be able to define your goals so all your managers can see them clearly. The first is for top management to develop a basic corporate philosophy."

Another step in defining company objectives is to plan operations based on the philosophy. That gets away from the usually uncreative operation on a day-to-day emergency basis.

● **Cultivate Ideas**—Four principal areas in the cultivation of new ideas, Mr. Dively believes, are in market study, product development, industrial engineering, and staff research.

"An accurate and continual appraisal of market requirements is fundamental to progress of any company," he says. In product research, he feels that "most companies can justify the expenditure of more of their sales dollar." His company budgets about 5 per cent for the purpose and plans to increase that as it builds the necessary technical organization. Its industrial engineering studies have led Harris to spend considerably more than its depreciation allowance for new equipment.

Harris' staff research concentrates on personnel and financial matters, particularly for pension and incentive compensation plans, financing methods, retirement programs, wage structures, etc.

"A continual spirit of research on a broad basis," says Mr. Dively, "provides both the spark and the flame of progressiveness."

● **Develop Management People**—"The enthusiasm and drive engendered by the leader and his management team, and continuity of key executives, are the lifeblood of creative management," he believes.

To get that type of management, you must develop considerable skill in selecting, training, and stimulating people.

Harris brings in four or five carefully selected graduates of engineering or business schools for a one to two year on-the-job training program.

"On the training side of developing management people, individual coaching and realistic appraisals are probably the most effective techniques," Mr. Dively thinks.

To stimulate management people, he believes in a fertile company atmosphere and real delegation of responsibility.

The two most effective personal stimulants are incentive compensation and ownership interests. Harris has incentive plans for all employees. It has also established stock options for key executives.

● **Where the Buck Stops**—"The chief executive should set the creative tone," says Mr. Dively, "but it should be a usefully creative atmosphere where ideas are sifted and weighed, preferably by the original innovators themselves. And the boss must be more than just an agreeable fellow. If all an executive does is agree with his subordinate, you don't need both.

"Truly creative management can give us the greatest possible safeguard for our competitive, free enterprise system and for its continuing progress."

How to Be Creative About Profits

CREATIVITY is often thought of solely in terms of research or marketing. But the spirit is needed everywhere in a business. Take accounting and profit planning. Marshall K. Evans, vice president-management services, Westinghouse Electric Corp., says "Management needs improved ways of dealing with the profit pattern of a company or division." He asks:

- How can we evaluate the strong and weak points in the profit pattern to establish objectives that are pinpointed to the organization's needs?
- How can we compare the financial effects of alternative courses of action designed to improve the basic profit pattern?
- How can we report the effects of different influences on the profit pattern to learn whether objectives are being accomplished, and, if not, what changes to make in the plan of action?

Mr. Evans and his associates have come up with a creative approach to answer those questions.

Westinghouse segregates costs and expenses into categories according to how they respond to short term changes in sales volume. Three cost categories are product costs, committed costs, and managed costs.

Product costs respond directly to changes in production and sales levels and include direct labor, materials which become part of the product, and factory and other overhead expenses which are closely allied with production—indirect product materials, shop supplies, and some elements of indirect shop labor.

Any costs which remain fixed, over the short term, regardless of production levels, are committed costs. They are associated primarily with expenses for capital facilities—depreciation charges, insurance, taxes, rents. Over the long pull, they will vary, but they do not respond to fluctuations in volume within the limits of present facilities.

All other elements of general overhead expenses are managed costs. They're distinguished by the fact they are subject to change by management. They include policy expenses for advertising and research and operating charges beyond direct product costs—outlays essential to day-to-day business operation but subject to judgment as to amount and extent. Examples are salary expenditures; factory related manufacturing services for planning, purchasing, and quality control; and general service charges for accounting, industrial relations.

Westinghouse asks divisional executives to set profit goals, then suggest ways to reach the objectives. The three-way cost breakdown helps with that job. Each division's strategy varies with its circumstances.

If the research indicates its product costs are out of line, Westinghouse has techniques to cut them—redesign, capital equipment expenditure, new plant layouts, component interchange.

Committed costs are the toughest to change. Changes usually are made only as a last resort. Overcapacity is the common reason for awry committed charges. If that's the problem, the strategy may have to be consolidation into a new or smaller plant.

Out-of-line managed costs are the most frequent problem. More than 50 per cent of Westinghouse's managed costs are in areas (such as report writing, data storage, inventory control, payroll, and invoicing) that can be improved by data processing.

Mr. Evans sums up: "The profit pattern concept provides for the segregation of income and cost data according to the factors which cause them to change—price levels, sales volume, product mix, changing labor and material rates, and cost reductions through redesign and methods improvements.

"By segregating the elements of profit performance, the concept reveals to management the general lines of approach which must be taken to improve results. Once this is done, specific plans of action and tools of improvement can be utilized. The profit pattern arrangement facilitates evaluation of various courses of action."

What to Do?

Renato Tagiuri, associate professor at the Harvard School of Business Administration, suggests that the first step a company must take is to recognize who the creative spirits are in the organization. The second step is to handle them with care . . . by surrounding them with a climate propitious to creative effort.

John D. Rockefeller Sr. once said: "There are two kinds of people in management—the builders and the caretakers. Be careful you don't pay the caretakers too much. If you do, they will run you out of business. Be careful, too, with builders because there aren't many of them, and you can't overpay them."

While they are both important, it's wise to determine which is which.

The "caretaker" is usually orderly and systematic. He delights in co-ordinated operation. Essentially a technician, he likes to improve and perfect rather than to strike out in uncharted directions. He is seldom much of a gambler. He may have a strong interest in people and in co-ordinating their efforts. He's like a coach who takes his pride in developing championship teams. He puts great stress on policies and standard procedures. He is well disciplined.

The innovator or builder is mentally restless, roving, inquiring, unorthodox, unpredictable, uncontained. He is not always comfortable to live or work with. He thinks in terms of goals, not procedures; in terms of unresolved problems and possible solutions. He is frequently most effective as the nucleus of a small informal task force. He loses interest when solutions are conceived and is weak in details and follow-through. He often has an almost mystical sense of mission. He's a gambler and is neither particularly happy nor well adjusted. Yet, he views life as an exciting adventure. Above all, an innovator can rise to exceptional occasions.

When self-educated Andrew Jackson was awarded the degree of doctor of laws from Harvard in 1829, many wondered how he would respond. It was customary for the recipient in those days to say a few words of thanks—in Latin. The Chief Executive met the challenge by saying:

"Caveat emptor, corpus delicti, ex post facto, dies irae, e pluribus unum, pro bono publico, usque ad nauseam, Ursa Major, sic semper tyrannis, quid pro quo, requiescat in pace."

Today, you may be able to find more reliable clues to the creative spirit than a knowledge of Latin phrases. But you must do more than just recognize your innovators. You must also know what inhibits their creativity. Sohio's Mr. Ohmann cites these seven barriers:

1. The industrial organization is essentially authoritarian in design and operation.

2. Mass production is based on standardization and the inflexible repetition of operating procedures.

3. The principle of specialization of function and the practice of structuring the organization around each of these segmented functions make it difficult to visualize and understand the whole job.

4. The line and staff form of organization usually leads to an unfortunate separation of the research and analytical functions from the operating job. The lack of integration of staff and line sometimes stifles creativity in an unrealistic vacuum.

5. Bigness *per se* militates against creativity because it reduces the individual's sense of personal responsibility.

6. The inbred culture of a company constitutes a silent but steady pressure for conformity which further inhibits innovation.

7. The corporation as a power structure tends to resist change. Thus, it is not permissive and creative in its climate.

The Creative Climate

The seven barriers seem almost unsurmountable. Even the recitation of them could be an uncreative way to tackle the problem. But you have to know the nature of the difficulties before you can deal with them. The solutions lie in creating suitable corporate climates.

"Top management is the group most sorely in need of a livelier creative spirit," says Harvard's Professor Tagiuri. That's because top managers set the tone in their companies. They *are* the climate.

Union Carbide Corp.'s John Paul Jones, general manager of management personnel services, believes some people get less and less creative as they rise in a company. The higher they are, the bigger the halo. They are challenged less and less frequently by subordinates or even peers. Challenge is the lifeblood of creativity. Without it, man's inventiveness tends to dry up.

So, to foster more creativity, build creative management, as suggested by George S. Dively, chairman and president of Harris-Intertype Corp., Cleveland (see Page 34).

Having work move on conveyor belts to the people instead of people moving to the work is an example of managerial creativity. But that idea came a generation or more ago, and we need new ones now—ideas to solve the problem of the spiraling wage increases, of work rules, of achieving more creativity itself.

If you build a creative management, you can do a number of things to make its job easier, points out Sohio's Mr. Ohmann:

1. Establish within your organizational structure a unit reporting to the chief executive and devoted entirely to economic studies, enterprise research, and long range planning. Those units can furnish integration and perspective to creative study groups at lower levels in the company.

2. Integrate staff activities more closely with line.

3. Use special task forces and research teams to counteract the effects of specialization.

4. Give such groups full knowledge of goals. Orient them on the problem but be careful not to dwell too much on how you think objectives should be met.

5. Reorganize the office force to free the professional man of all possible routine.

6. Use formal approaches to creativity, such as brainstorming, with extreme care. Sometimes, they help loosen up a rigid organizational structure, but their danger is that they too can become formal and inhibiting.

7. Protect your innovators. They are often organizational screwballs—and particularly subject to discharge in the periodic personnel prunings.

8. Pay your creative people well so that they need not seek promotion into supervisory jobs to be advanced financially.

9. Listen to all ideas.

Nobody has a formula for achieving greater creativity in industry. And anybody who advances one is probably a quack. The foregoing are just suggestions that may help—and we need it. Hear Dr. Albert Szent Gyorgyi, Hungarian-born Nobel prize winner now working in the U. S.:

"Our trend (in the U. S.) is to replace creativity by numbers, quality by quantity. Our reasoning is analogous to saying that if one woman can produce a child in nine months, nine women will produce it in one."

PLAN FOR PROFIT GROWTH

Invent for Profit Growth

On July 17, STEEL will show how to organize for inventions that will keep your profits growing. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

What the Tin Price Jump Means

THE TIN MARKET is riding a madcap spiral that shows no sign of slowing down. Traders and producers admit they're as baffled about the future as consumers.

One fact stands out: The checks so carefully built into the tin pricing structure have vanished. The bulls are in command. The price, after climbing steadily since January, has rocketed the last few weeks. As STEEL went to press, the New York price was $1.19 a pound (it has been as high as $1.20, the peak since the Korean War and highest ever for a peacetime market).

• The Crux—The dilemma won't be solved overnight. For four years, the market has been living on "borrowed time," with rising consumption exceeding decreasing production. Metal needed to fill the gap has come from the buffer stock of the International Tin Council and the government stockpiles of the United Kingdom and Italy.

Current price activity was touched off by the closedown of mines in the Congo last December. The Congo and the adjacent U. S. protectorate of Ruanda and Urundi, turned out 10,085 long tons last year and is capable of doing much better—14,281 long tons in 1957, for example.

Production problems have cropped up in other major producing countries. Nowhere are they more acute than they are in Bolivia, the third largest producing nation, where labor problems and politics have played havoc with output.

Production has also been down in Indonesia, the second largest producer. Part of the problem is tied to heavy rains earlier in the year, but it goes a lot deeper—politics is also involved.

• No Checks Left—The immediate push behind the price: Stocks held by the International Tin Council to block such a development have been sold.

Internationally, tin is treated differently from any other metal. In July, 1956, the International Tin Council was set up to control production and to hold prices at a level high enough for producers to make a profit—but not high enough to discourage consumption. The major producing nations and many of the consuming ones are members. The U. S. does not belong. Neither do any of the Red Bloc nations.

The council imposed production quotas on its members from Dec. 15, 1957, until Oct. 1, 1960. At that time, it became apparent a supply-demand imbalance was shaping up. Since its formation, the council has attempted to stabilize prices by buying when the market was weak and selling when it was strong. The council's buffer stock manager is obligated to buy when the London price is under the equivalent of 91.25 cents a pound in the U. S., and he must sell when the price reaches $1.10.

The system has worked until now. When the price went above $1.10, so many buyers came into the market that the 10,030 long tons in the buffer stock were soon depleted.

• Shortage Shaping Up—The conclusion of most analysts is that Free World demand will run about 20,000 long tons over availability this year—even though Canada will release (from stockpile) 2400 long tons during this year, plus 600 tons in January and February of 1962, and Italy will dispose of 2000 long tons.

• What's Ahead?—The U. S. could ease the pressure by releasing the 3933 long tons of metal held by the General Services Administration at Texas City, Tex. Disposal is being stalled, say insiders, by the objections of the State Department's South American desk, despite strong appeals from other government agencies and industry sources. The State Department is reportedly holding back because of objections from Bolivia which evidently wants to reap an immediate profit.

This same consideration may influence any decision to release tin in the national stockpiles (estimated at 300,000 to 400,000 tons). Congress and many government agencies are believed to look favorably toward trimming these stocks, which are estimated to be 40 per cent in excess of updated defense requirements. Look for industry to push for stockpile disposal.

• Relief May Be Coming—Beside possible U. S. stockpile disposal, there are other favorable signs. Observers believe that the improved political climate in the Congo may lead to the reopening of mines there. Production is running smoothly in Thailand and Nigeria.

Malaya, the world's largest producer, will increase output by 3000 long tons to 55,000 long tons this year, reports R. D. Coursen, director of the Malayan Tin Bureau. Current prices will stimulate the output of marginal and submarginal mining properties, he adds.

Even more important for the long run, new mines are being opened. But it takes two to five years to progress from exploration to production.

• Price Trend? — Too many unknowns are involved to speculate about prices over the next few weeks. Speculation has been at the heart of the climb, and there's no telling what the psychology of the market will be in the future. The new International Tin Council met last Saturday (July 1) for the first time. Anything the council says will have an effect on the market. Insiders say a negative or weak reaction to the situation could bring a runaway market. They also believe that positive steps can be taken to stabilize things.

Remember: A lot of tin is being held by speculators. If they begin to dump tin, prices will come down.

Regardless of what happens over the next few weeks, one fact seems to be shaping up: It looks like you'll pay more for the metal over the rest of 1961 than at any time since the early 1950s.

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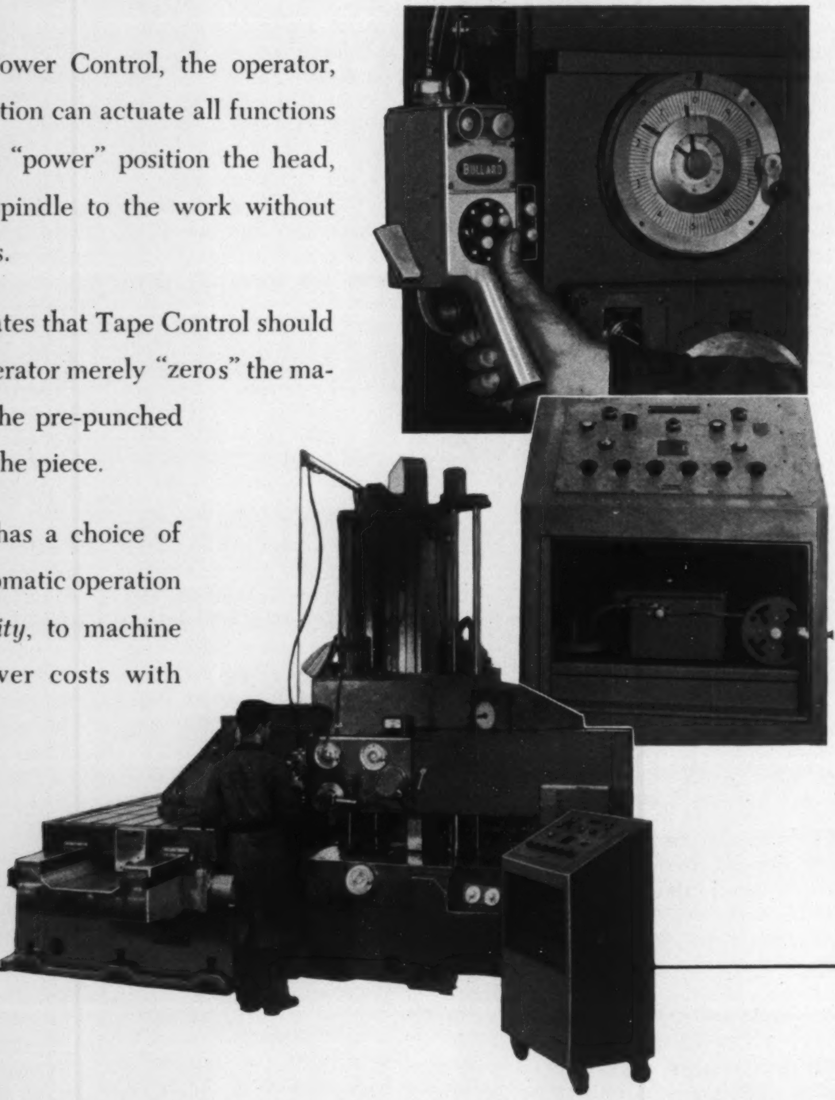

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Does Ford Want to Catch GM?

How the Auto Market Has Shifted

(Percentage of production)

	GM	Ford	Chrysler	Independents
1961*.	51.5	30.4	10.5	7.6
1960	47.7	28.3	15.2	8.8
1958	51.1	28.7	13.7	6.5
1956	52.8	28.8	15.0	3.4
1954	52.2	30.6	13.1	4.1
1952	41.5	23.2	22.0	13.3
1950	45.7	23.3	18.0	13.0
1948	40.0	19.1	21.3	19.6
1946	38.4	21.2	25.0	15.4
1942	42.6	22.0	22.9	12.5
1940	45.9	18.9	25.1	10.1

*Production to date. Source: *Ward's Automotive Reports.*

DETROIT'S BUZZING about the public issue of Ford Motor Co. stock has dusted off the perennial questions:

1. Can Ford catch General Motors Corp. in the auto race?
2. Does it really want to?
3. What happens to the rest of the auto industry if it does?

Talk to any Ford executive and he'll be quick to point out that the company is firmly entrenched in second place, but it's still only half the size of GM in net worth and annual net income. Any "first place" talk appears academic. But in the next breath, he's apt to quote Detroit's favorite axiom: "You can't stand still in the auto business."

• History Retold — Complacency toppled Ford from its kingpin perch in the Model T era to a feeble third place after World War II. Four years running (1946-49), Chrysler outproduced and outsold it in the market place.

In 1946, Henry Ford II persuaded Ernest R. Breech to reorganize the company along GM lines. By 1955, Ford had second place solidly cinched. Its 1950-55 net income totaled $1.4 billion compared with some $600 million for the 1946-49 period (before that, it was losing $10 million a month). Most of the gains came at the expense of Chrysler and the independents.

During its recovery, Ford closely copied GM's organizational structure. And for a long time it tried to match the giant automaker on a model for model basis. The Edsel was its last abortive effort in that direction. But in the last few years, its newly won strength has given it the maturity to step out on its own.

• Independence Indicators — In 1955, Ford fostered the Supplemental Unemployment Benefits concept in industry labor contracts. Marketwise, the company appears to have been the first to thoroughly understand and to exploit the segmented concept: Cars are put to six or seven uses today, and various sizes and prices of cars must be made available for each of the segments. Falcon's initial success shows that Ford was closer than Chevrolet in first tagging the economy market.

Instead of trying to maintain each car division as an autonomous group charged with design, engineering, production, and sales responsibilities, the Ford parent company now has delegated most of the engineering and production authority for all company lines to the Ford Div. Lincoln-Mercury Div. functions primarily as a sales outlet.

The most recent efforts at pioneering have been in the product design itself. Ford introduced the lubeless chassis.

It was also the first to extensively use galvanized steel in critical corrosion areas. It made a breakthrough with its stainless steel Thunderbird muffler. Most obvious of all—Ford refused to go along on the aluminum engine kick.

• The Road Ahead — Motordom thinks Ford's biggest problems lie in how it can expand. If it attempts a real sales donnybrook with GM, Chrysler and Studebaker-Packard Corps. are the ones most apt to suffer. Neither can afford to lose much more of the market, and the industry is afraid of antitrust action if either firm should go under.

Justice Department sources tell STEEL that it's concerned too. The feeling is strong that there must be more than two or three com-

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Chevrolet Cuts Valve Finishing Costs

COST OF FINISHING small valves for automatic transmissions has been reduced 30 per cent by the use of a continuous flow vibrating finisher at the Bay City, Mich., plant of GM's Chevrolet Motor Div. The entire process is handled automatically by equipment designed and built by Roto-Finish Co., Kalamazoo, Mich.

Only six or seven types of valves which will be running directly against aluminum are given this final finish which puts a 0.0015 to 0.003 in. radius on the sharp edges. The valves are machined from SAE 1112 steel and sent through a six station, grinding and lapping line. The finishing barrels are at the end of this line.

Valves automatically are conveyed to the finisher and drop into the first vibrating barrel which contains a dozen baffles and 500 lb of No. 3½ aluminum oxide chips and a special water soluble lubricant. The barrel vibrates at a controlled rate of 1200 cpm. Media and valves are carried through the barrel in 12 minutes. The agglomerate is pushed out the other side onto a separation tray where the valves are shunted and collected for final washing. The compound is automatically recirculated and washed for re-use. In the washing and cleaning process, a screening operation separates any fines from the chips. The barrel is lined with neoprene. Chevrolet says there has been no appreciable lining wear in the first three months of operation.

panies in the automotive business. GM is currently involved in five antitrust suits. Ford company officers have made it clear they'll go a long way to avoid such litigation.

As autodom sizes it up, several immediate courses are open to Ford. It can gradually readjust its dealer organization to aim directly at individual makes and even specific styles of GM cars. That would help insure that any conquest sales would come primarily from GM, not from other automakers. It's a tough approach to fight too. Because of its size, whenever GM nudges the market, it tends to create a tidal wave instead of a ripple. That could endanger the survival of the other companies.

Secondly, Ford can greatly expand its overseas facilities and strive for leadership of the world car market. It already is running GM a close race overseas. Last year, Ford's foreign plants sold 830,653 cars and trucks, against GM's 976,619 units. That's only 15 per cent less compared with almost 40 per cent in domestic vehicle sales. Henry Ford II already has affirmed that the company will explore every opportunity to strengthen and expand its international operations.

Finally, the Dearborn automaker can diversify into other product fields. To some extent, it's doing that now with the buildup of its space minded Aeronutronics Div.

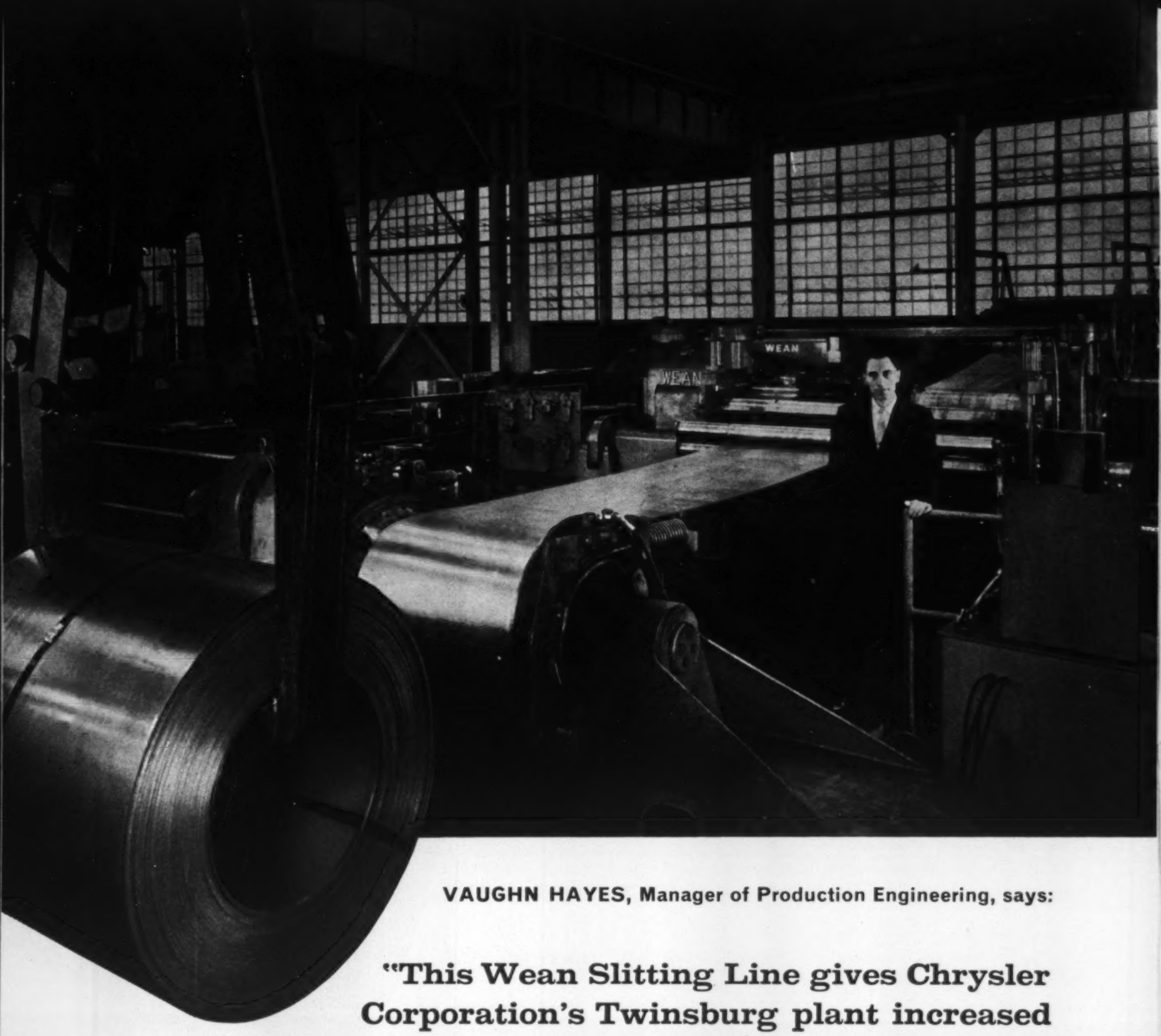
- **May Solve Itself**—Of course, if one of the independents should drop out in the next five or six years, it would leave a big market gap that Ford could fill with less fear of antitrust action than could GM. If Detroit's rebels had their way, Ford probably would win by default. Mavericks would like to see Chevrolet split away from GM and set up on its own. Last year, it accounted for half of that company's unit sales so such action would automatically put Ford on top. In fact, however, that kind of divorce is most unlikely. GM doesn't want it. Even if the Justice Department could force such an action, the legal delays would take years.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688.690
February	364,385	659,298
March	407,959	654.241
April	446.739	582,869
May	542,303	611.260
5 Mo. Totals	2,117,243	3,196,358
June		613,136
July		434.377
August		305.514
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108
Week Ended	**1961**	**1960**
May 27	129,142	142.359
June 3	85.645	115,068
June 10	127.256	139,423
June 17	129,274	137,641
June 24	128,830†	141.247
July 1	127,000*	125,868

Source: *Ward's Automotive Reports*.
†Preliminary. *Estimated by STEEL.



VAUGHN HAYES, Manager of Production Engineering, says:

"This Wean Slitting Line gives Chrysler Corporation's Twinsburg plant increased flexibility in production planning by allowing us to purchase standard size mill coils. We slit these coils to meet specific production requirements, eliminating special-width coil purchases. The line's 2,000 ton-per-month output helps us eliminate production delays and coil supply problems." Mr. Hayes' comments are typical of reasons why companies are using the *coil processing concept* to lower material costs, reduce inventory requirements and decrease scrap loss. If you process 500 tons or more per month of flat rolled metals, write for our new brochure entitled, "Coil Processing."

This brochure explains the concept and economics involved in *coil processing*. It also illustrates the types of Wean equipment that can help you cut inventory, production, and material costs when you process standard *mill* coils instead of sheets.

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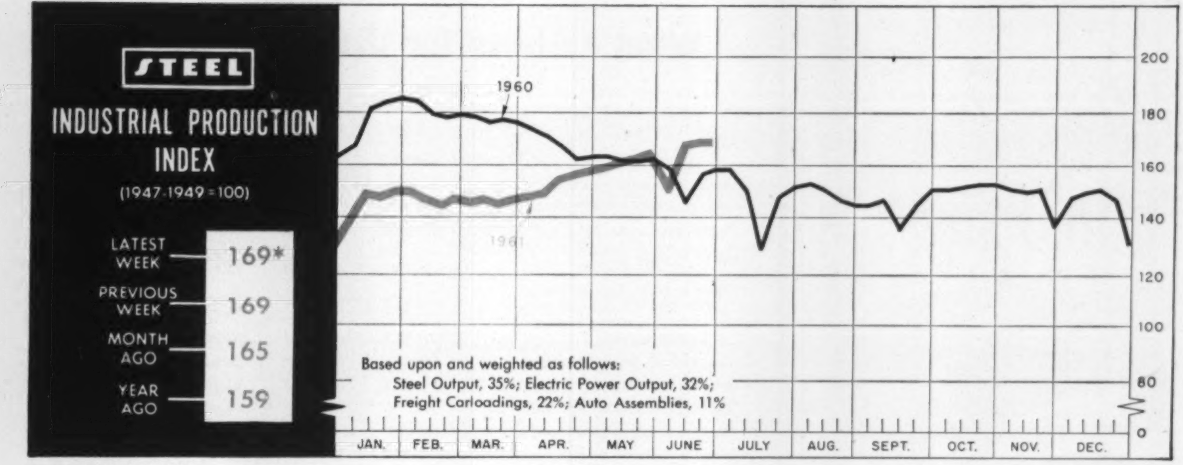

*Week ended June 24.

Upturn Firmly Entrenched at Midyear

"YOU CANNOT FIGHT the figures," declares Dr. Heinz E. Luedicke in the *Bulletin* of the National Association of Purchasing Agents. At midyear, the figures overwhelmingly point to a solid, broadly based recovery. And there's every indication that it will continue well into 1962.

"Those who are still fighting the current business recovery, either because it came much sooner than they expected or because they thought that the recession would turn into a first class depression, are going to be forced to reconsider their positions as the May data . . . become available," he chides.

• **Don't Be Misled**—It is true that many of the statistics are still below the year-ago positions, and that is causing some pessimists to downgrade the extent of the improvement. "These 'doubting Thomases' . . . may have to wait until the summer is nearly over before they are convinced of the reality of business recovery . . . Advances (by then) will be countering declines in activity last summer. By late summer, the lines should begin to cross," Dr. Luedicke states.

He expects the usual summer slump in activity to be less pronounced than it has been in most years because of the cyclical improvement. "It is even possible that data unadjusted for seasonal variation will be used by some observers to prove . . . that this is a 'false' recovery," he warns. "Such contentions, however, cannot alter the fact of genuine business improvement."

• **Possible Miscues**—The unusually strong contribution of the steel and auto industries to the improvement in the Federal Reserve Board's industrial production index may also lead some analysts astray when that strength begins to wane. These two factors have accounted for nearly one-third of the comeback in the FRB index since February

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,970[1]	1,978	1,510
Electric Power Distributed (million kw-hr)	15,450[1]	15,345	14,604
Bituminous Coal Output (1000 tons)	8,870[1]	8,470	8,838
Crude Oil Production (daily avg—1000 bbl)	7,100[1]	7,105	6,820
Construction Volume (*ENR*—millions)	$469.6	$403.4	$485.1
Auto, Truck Output—U. S., Canada (*Ward's*)	160,309[1]	165,531	177,129
TRADE			
Freight Carloadings (1000 cars)	600[1]	602	642
Intercity Truck Tonnage (changes from year ago)	+1.2%	−0.1%	−5.8%
Business Failures (Dun & Bradstreet)	351	349	353
Currency in Circulation (millions)[2]	$32.2	$32.3	$31.9
Dept. Store Sales (changes from year ago)[2]	+7%	+5%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$33,259	$27,387	$30,513
Federal Gross Debt (billions)	$291.1	$290.0	$288.9
Bond Volume, NYSE (millions)	$25.2	$26.6	$27.6
Stocks Sales, NYSE (thousands of shares)	16,077	16,320	18,280
Loans & Investments (billions, adjusted)[3]	$113.8	$111.4	$104.2
U. S. Govt. Obligations Held (billions)[3]	$33.1	$31.4	$25.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	226.5	223.0	231.9
All Commodities[6]	118.7	118.7	119.5
Commodities Other than Farm & Foods[6]	127.7	127.7	128.3

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*Dates on request. [1] Preliminary. [2] Federal Reserve Board. [3] Member Banks, Federal Reserve System. [4] 1935-39=100. [5] 1936-39=100. [6] Bureau of Labor Statistics Index, 1947-49=100.

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What's Ahead for U.S. Business?*

	3rd Qtr 1961	4th Qtr 1961	Yearly Avg 1961	1st Half 1962
Gross National Product ($ billions)	518-520	528-532	515-517	545-555
Govt. Spending, Goods & Services ($ billions)	107-109	109-111	107-109	111-113
Defense Spending ($ billions)	47.6-48.0	48.2-48.6	47.6-47.9	49.0-51.0
Industrial Production (1957 = 100)	110-112	113-115	108-110	115-119
Total Construction ($ billions)	56.7-57.0	57.2-57.6	56.5-57.2	57.8-58.6
Total Housing Starts (millions of units)	1.36-1.40	1.40-1.44	1.34-1.38	1.44-1.52
Plant & Equip. Expenditures ($ billions)	34.3-35.0	35.2-36.0	34.3-35.0	36.0-37.5
Mfrs.' Inventories ($ billions, end of period)	53.2-52.9	52.9-53.1	52.9-53.1	53.0-56.0
Consumer Spending ($ billions)	338-340	344-347	336-338	357-363
Employment (millions, unadjusted)	67.5-67.9	68.2-68.5	66.4-66.8	68.0-68.4
Unemployment (millions, unadjusted)	5.1-4.7	4.8-4.5	4.8-5.1	4.4-4.0
Spendable Income ($ billions)	366-369	369-374	364-367	384-390
Corporate Profits ($ billions)	23.5-24.5	25.5-26.7	22.5-23.5	27.4-28.4

*Seasonally adjusted annual rate unless noted otherwise.
Source: Prentice-Hall Inc.

compared with only 10 to 25 per cent in previous recessions, notes Addison T. Cutler, special economist of the Federal Reserve Bank of Cleveland.

Even if these two giants contribute relatively less to the uptrend during the rest of the year, they will still have some effect on it. And this, combined with buildups in other areas (such as business spending on inventory and new equipment, consumer spending for housing and durable goods, and rising government expenditures) should avert any relapse.

- **Longer Look** — The assurance that this is a genuine recovery has prompted some business analysts to take a longer look at the economy. A. J. Ashe, director of business research for B. F. Goodrich Co., Akron, sees factory output running at an even more rapid rate than gross national product (GNP) by the second quarter of next year. He sees a 10 per cent growth in the GNP annual rate by then. Employment will be at a record high, and unemployment, though still above prerecession levels, will be under the current level. "To cite one measure of optimism for the first half of 1962, we expect automobile production during the period to run at a 6.5 million unit annual rate," he states.

One of the more detailed forecasts for the next 12 months is given by Prentice-Hall Inc., Englewood Cliffs, N. J. (see table above). "Investment expenditures for plant, equipment, and residential housing will rise beyond old high marks by the spring of 1962. Consumers, their confidence restored, will loosen purse strings as never before," P-H declares. These spending streams will combine to produce "an unusually strong and lengthy phase of expansion."

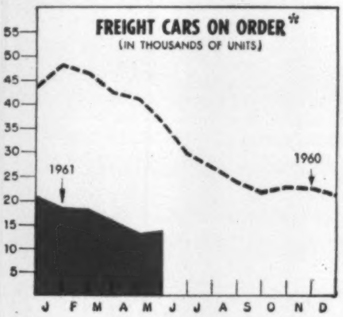
Data Confirm Optimism

Most of the May data tends to confirm the feelings of optimism. While some of the data are still at relatively low levels, the direction is unmistakably up.

One of the most encouraging reports comes from the Industrial Heating Equipment Association Inc. which says that new orders for May totaled $9,653,000, up 129 per cent from the April total, up 52 per cent from the year-ago figure, and up 51 per cent from the 1960 monthly average.

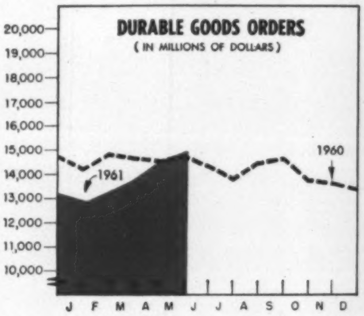
The American Railway Car Institute reports the first upturn in freight car backlogs since last October (see chart and table, Page 45).

Billings of industrial supplies and equipment at the wholesale level



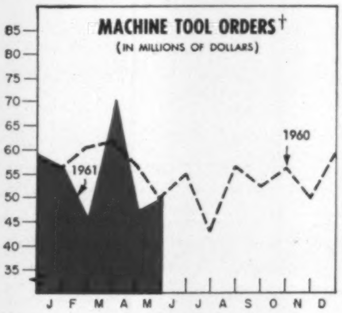
	Domestic Awards 1961	Domestic Awards 1960	Backlogs (end of month) 1961	Backlogs (end of month) 1960
Jan. ..	1.339	5.742	18.894	48.170
Feb. ..	1.536	3.211	18.429	45.323
Mar. ..	1.796	1.957	15.801	42.131
Apr. ..	2.040	5.352	13.658	41.003
May ..	3,666	2.285	13,964	36.106
June ..	....	316	.....	29.555
July ..	....	1.331	.....	26 658
Aug. ..	....	1.333	.....	23.866
Sept. ..	....	2.206	.....	21.662
Oct ..	....	5.864	.....	22.900
Nov. ..	....	3.740	.....	22.781
Dec. ..	....	2,705	.....	21,070
Total .	....	36,368		

*Domestic only.
American Railway Car Institute.



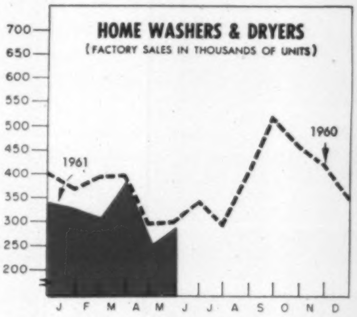
	New Orders* 1961	New Orders* 1960	Sales* 1961	Sales* 1960
Jan. ..	$12.880	$14,190	$13.170	$15.450
Feb. ..	13.360	14.800	13.320	15 670
Mar. ..	13.820	14.610	13.690	15.170
Apr. ..	14.580	14.470	14.150	15.000
May ..	14,900†	14.680	14,600†	15.060
June ..	.....	14.340	.....	14.880
July ..	.....	13.840	.....	14.730
Aug. ..	.....	14.410	.....	14.420
Sept. .	.....	14.620	.....	14,410
Oct. ..	.....	13.740	.....	14.080
Nov. ..	.....	13.600	.....	13.810
Dec. ..	.....	13,220	.....	13,620

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.



	New Orders (000 omitted) 1961	New Orders (000 omitted) 1960	Shipments (000 omitted) 1961	Shipments (000 omitted) 1960
Jan.	$56.100	$56.450	$45.500	$46.400
Feb.	46.100	60.600	45.650	51,950
Mar.	70.050	61.950	54.850	64.500
Apr.	47.650	51.850	53.700	55.100
May	50.300*	49.950	57,800*	56.350
June	.....	55.100	.....	63.100
July	.....	42.950	.....	51.300
Aug.	.....	56.850	.....	47.900
Sept.	.....	52.300	.....	53.950
Oct.	.....	56.200	.....	51,350
Nov.	.....	49.950	.....	48,550
Dec.	.....	59,000	.....	61,350
Totals	.....	$653.150	.....	$651,800

†Cutting and forming. *Preliminary.
National Machine Tool Builders' Assn.
Charts copyright, 1961, STEEL.



	Washers 1961	Washers 1960	Dryers 1961	Dryers 1960
Jan.	228,919	254,900	103.158	111.600
Feb.	227.562	283.900	81.310	108.400
Mar.	305.590	306.000	82.093	90.200
Apr.	209.695	236.200	46.042	53.200
May	247.904	244.200	42,672	53.700
June	......	277.300	......	64.900
July	......	217.700	......	72,600
Aug.	......	296.500	......	105.100
Sept.	......	352.700	......	165.500
Oct.	......	305.800	......	151.900
Nov.	......	275.300	......	142.000
Dec.	......	223.500	......	119.200
Totals	.....	3,274,000	......	1,238,200

American Home Laundry Mfrs. Assn.

showed an 11.2 per cent increase in May compared with April, reports the National Industrial Distributors' Association.

New orders for resistance welding equipment moved ahead in May compared with April ($1.46 million vs. $1.32 million), but shipments slipped from $2.61 million to $2.32 million, reports the Resistance Welder Manufacturers' Association.

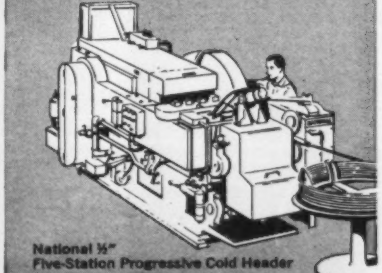
On the other hand, the gains in orders and shipments of machine tools (see graph and chart above) were so small as to be insignificant trendwise. A dip of nearly 10 per cent in the sale of used machine tools in May indicates there is still no big demand for such equipment.

still more parts from wire!
Weld Stud 70/min.
Tube Fitting 60/min.
Flanged Collar 85/min.
Ball Stud 60/min.
70 Amp. Connector 100/min.
Quick Release Nut 115/min.

These important parts are cold-formed from coiled wire, start to finish in compact, efficient National Cold Headers.

These parts are formed practically scrapless. All achieve remarkable savings over past methods.

If you make odd-shaped parts, may we help you evaluate them for cold-forming from wire? Better yet, come to Tiffin, witness our demonstrations and let's discuss your work.


National ½" Five-Station Progressive Cold Header

NATIONAL MACHINERY CO.
TIFFIN, OHIO, U. S. A.
HARTFORD DETROIT CHICAGO

FRED H. EDGAR
Olin-Metals Div. v. p.

CHARLES A. STONE
Stewart Die Casting post

CARRA L. LANE
Chicago Pneumatic v. p.

GRADY L. ROARK
Allegheny Ludlum sales

Fred H. Edgar was made vice president-aluminum sales, Metals Div., **Olin Mathieson Chemical Corp.,** New York. He was director-aluminum extrusion operations. Mr. Edgar succeeds **Derek Richardson,** named vice president-marketing of Olin's Chemicals Div.

Charles A. Stone, with Stewart Die Casting Div., **Stewart - Warner Corp.,** since 1937, was named to the new post of marketing manager, with supervisory responsibility for the sales of both the Chicago and Bridgeport, Conn., die-casting plants of the company.

Shinn Industries Inc., Santa Ana, Calif., appointed **Eugene M. Stoner** director of product development. He was chief engineer, Armalite Div., Fairchild Engine & Airplane Corp.

James Fairbairn, former purchasing agent, was made director of purchases for **H. M. Harper Co.**, Morton Grove, Ill.

Carra L. Lane was elected vice president, **Chicago Pneumatic Tool Co.,** New York. Former manager of plant operations, he continues supervision of all manufacturing operations of all company plants, and is also responsible for co-ordinating operations of the subsidiaries, Allen Mfg. Co. and Jacobs Mfg. Co. **Thomas F. Noonan** was elected vice president, continuing as comptroller.

Patsy F. Georgino was made purchasing agent, **Speer Carbon Co.**, St. Marys, Pa., succeeding **J. O. Bennett,** retired.

Arthur H. Wooler, assistant vice president - manufacturing, **Hughes Tool Co.,** Houston, succeeds **Harry E. Rogers**, retired vice president-manufacturing.

W. R. McMahon was elected vice president-engineering, **Modine Mfg. Co.,** Racine, Wis. He was director of engineering and research.

Grady L. Roark was made general manager of sales, **Allegheny Ludlum Steel Corp.,** Pittsburgh. He was with General Electric Co., most recently as manager of marketing, High Voltage Switchgear Div.

J. B. Kopp was elected president, **Ingalls Iron Works Co.**, Birmingham. He succeeds **Robert C. Palmer,** who resigned to become president of R. C. Mahon Co., Detroit.

McKay Machine Co. named **H. Donald Allman** manufacturing manager of its recently acquired **Federal-Warco Div.** at Warren, Ohio. He will supervise manufacturing, purchasing, and hourly personnel. He was director of purchasing, production, and accounting at Wean Equipment Corp.

Kenneth A. Matticks was made product manager, stainless flat products, with **Crucible Steel Co. of America**, Pittsburgh. He was manager-technical services.

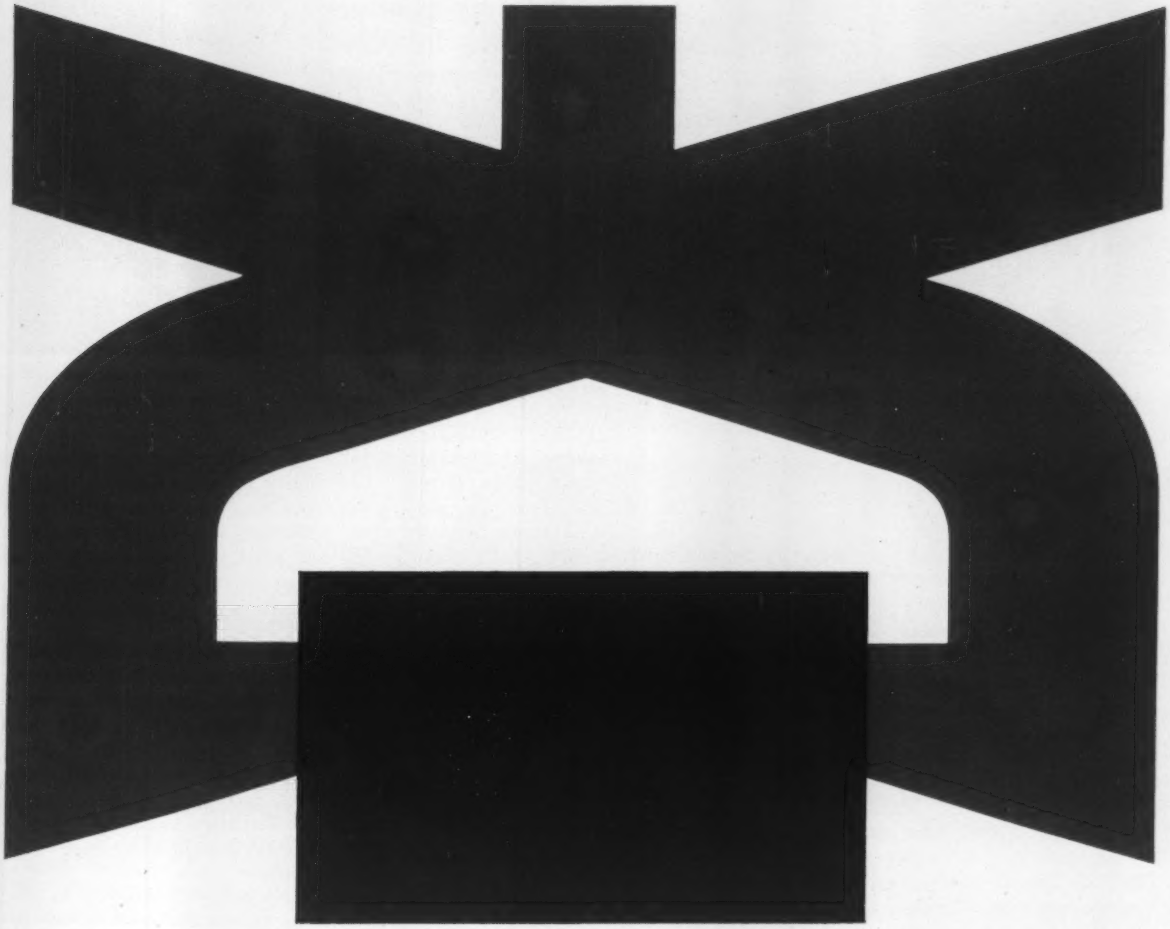
Robert Kaminski was made plant

JAMES FAIRBAIRN
H. M. Harper purchasing

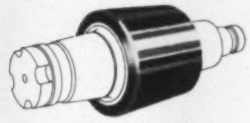
ARTHUR H. WOOLER
Hughes Tool mfg. v. p.

W. R. McMAHON
Modine engineering v. p.

KENNETH A. MATTICKS
Crucible product manager



Heppenstall rolls it, cuts it, handles it



Back-up roll sleeves and rolls

Slab
shear knives

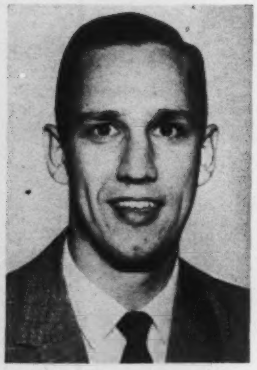
Scissors-type ingot tongs

Heppenstall Representatives are thoroughly experienced in the selection and application of our back-up roll sleeves and rolls, knives and tongs — from melt shop to finished product. Their know-how, gained in plant after plant, is always available to help you solve problems and improve efficiency in steelmaking operations. In each product division, modern laboratories are carrying on intensive research programs — for the improvement of present products and the development of new ones. For service or specific information, contact your nearest Heppenstall Representative or write us direct.

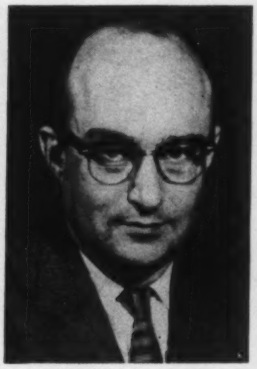
HEPPENSTALL COMPANY
PITTSBURGH 1, PA.
Plants: Pittsburgh & New Brighton, Pa. • Bridgeport, Conn.

MIDVALE-HEPPENSTALL COMPANY
NICETOWN, PHILADELPHIA 40, PA.

WELLS E. HUDSON
Pittsburgh Chemical post



LELAND P. McNABNEY
Vulcan Mold-Chicago p. a.



EDGAR G. GRANT
Daystrom appointment

JOHN W. GOTH
Climax Molybdenum sales

manager, **American Metallurgical Products Co.,** New Castle, Pa.

Wells E. Hudson was appointed sales manager-industrial coatings, Protective Coatings Div., **Pittsburgh Chemical Co.,** subsidiary of Pittsburgh Coke & Chemical Co.

William F. Aylard, former director of engineering, was named a vice president of **Chase Brass & Copper Co.,** Waterbury, Conn., subsidiary of Kennecott Copper Corp. He will co-ordinate research, engineering, and product development divisions.

Perry E. Magill was named works manager at **Jessop Steel of California,** Santa Fe Springs, Calif. He was works manager at Jessop's Steel Warehousing Div. in Broadview, Ill.

Robert A. Orr was made assistant to the president of **American Motors Corp.,** Detroit. He was an executive of General Electric Co., serving for the last ten years as general manager of its Vacuum Cleaner Div., Bridgeport, Conn.

Leland P. McNabney was named Chicago district purchasing agent for **Vulcan Mold & Iron Co.** succeeding the late **Donald Hanna.** His headquarters are at the Lansing, Ill., plant. He was with Combustion Engineering Co.

Edgar G. Grant was named director of new product planning, Military Electronics Div., Archbald, Pa., **Daystrom Inc.** He was engineering manager of the division.

William T. Egan was named general manager, **Yuba Mfg. Div.,** Benicia, Calif., Yuba Consolidated Industries Inc.

Robert S. Ragan was elected vice president of **Cincinnati Steel Castings Co.,** Cincinnati. He was chief engineer.

James W. Hill was named plant manager at Cleveland for **Bartlett-Snow Div.,** Bartlett-Snow-Pacific. He is in charge of all manufacturing operations of the company's product lines.

John W. Goth was made manager of foundry sales for **Climax Molybdenum Co.,** New York, a division of American Metal Climax Inc. Former head of the Chicago sales office, he continues headquarters in Chicago.

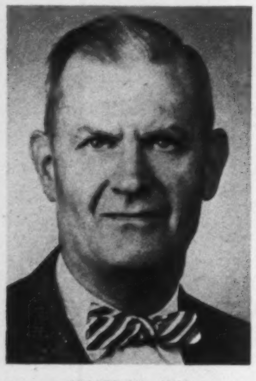
Claude W. Daniel succeeds **Hallis L. Poore,** retired, as plant manager of the Buffalo Div. of Anaconda American Brass Co.

Harry R. Mize was elected vice president and general sales manager of **Sterling Aluminum Products Corp.,** St. Charles, Mo., and subsidiaries.

W. W. Gould was promoted to nickel-iron battery market manager of **Exide's Industrial Marketing Div.,** Philadelphia, which is the national sales and service arm of Electric Storage Battery Co.'s Exide Industrial Div. and Nickel-Alkaline Battery Div.

Dan E. Baker was appointed vice president of **Androform Industries,** North Dighton, Mass. He was vice

ROBERT A. ORR
joins American Motors



JAMES W. HILL
Bartlett-Snow plant mgr.

W. W. GOULD
Exide marketing post

DAN E. BAKER
Androform v. p.

president-marketing of Atlee Corp.

Forest K. Milham was made manufacturing manager, **Narmco Materials Div.**, Costa Mesa, Calif., Telecomputing Corp. **Leonard P. Suffredini** was made product development manager for the division, a new post; **John H. McCann Jr.** succeeds Mr. Milham as quality control manager.

Charles S. Mertler was made engineering vice president of **Stevens Mfg. Co. Inc.**, Mansfield, Ohio. He was chief engineer.

Frederick C. Kroft, former works manager, was appointed staff assistant to the president of **Haynes Stellite Co.** in New York. Until Sept. 1 he will alternate between company offices in Kokomo, Ind., and New York where he will be permanently located. **Glen H. Shelton** succeeds as works manager.

Roy Willison was promoted to vice president and general manager, Industrial Div., **National Malleable & Steel Castings Co.**, Cleveland. He succeeds **Roy C. Hobson**, on leave of absence. Mr. Willison was controller.

Charles F. O'Riordan was made general manager, Defense Products Div., **Allis-Chalmers Mfg. Co.**, Milwaukee. He succeeds **Howard R. Hammond**, who has left the company. **Joseph M. Duncan** succeeds Mr. O'Riordan as manager of the North Central Region, with headquarters in Chicago.

Armco Div., Middletown, Ohio, Armco Steel Corp., promoted **George H. McClure** to assistant manager, sales administration. He is succeeded by **Dwight L. Hagedorn** as assistant manager, central sales. Effective July 1, **Frank R. Ditmars** becomes assistant manager, Western sales; **Bert F. Carothers Jr.** assistant manager, Eastern sales; **Edwin L. Singley** assistant manager, stainless steel products.

Republic Steel Corp. appointed **Robert H. Henke** manager of its Central Alloy Steel District, Massillon, Ohio, to succeed **Oscar A. Bamberger**, retired. **William C. Schnackel** replaces the late **Duffield A. Shardelow** as Detroit district sales manager. **John B. McBride** replaces the late **William F. Schupp** as St. Louis district sales manager.

FOREST K. MILHAM
Narmco Materials post

CHARLES S. MERTLER
Stevens Mfg. v. p.

FREDERICK C. KROFT
Haynes Stellite post

ROY WILLISON
National Malleable v. p.

JOHN A. MANDERS
Burgmaster mfg. v. p.

JOHN SOMERSET
Gleason Wks. v. p.

John A. Manders was appointed vice president-manufacturing, **Burgmaster Corp.**, Gardena, Calif. He was in charge of tooling, inspection, and methods.

Frederick G. Miller was made director of operations, Electronic Data Processing Div., Wellesley, Mass., **Minneapolis - Honeywell Regulator Co.** He succeeds **John R. Lenox**, made a vice president, EDP Div.

Mark C. Haselman, manager of **Altamil Corp.'s** Twigg Industries Div. at Martinsville, Ind., was named a vice president of the corporation.

Raymond C. Farr succeeds the late **Elmer F. Harris** as manager of production planning, **Tennessee Coal & Iron Div.**, Birmingham, U. S. Steel Corp.

Richard E. Savage, former sales engineer at the general offices of **Peterson Steels Inc.**, Union, N. J., was made Ohio district manager, with headquarters in Cleveland.

John Somerset, sales manager of **Gleason Works**, Rochester, N. Y., was named a vice president.

OBITUARIES . . .

William K. Hahn Jr., president, **Pittsburgh Tube Co.**, Pittsburgh, died June 17.

Paul E. Thomas, 59, assistant chief engineer for steel and coal with **U. S. Steel Corp.**, Pittsburgh, died June 21.

H. Robert Powell, 60, Chicago district sales manager, **American Cable Div.**, American Chain & Cable Co., died June 19.

John A. Wright, 65, vice president, Fabricated Metal Goods Div., Waterbury, Conn., **Anaconda American Brass Co.**, died June 16.

Lewis A. Holmes, 77, president, **Frank M. Weaver & Co. Inc.**, Lansdale, Pa., died June 19.

Weirton Boosting Capacity For Lightweight Tin Plate

LIGHTWEIGHT TIN PLATE will be produced on facilities to be installed by National Steel Corp., Pittsburgh, at its Weirton Steel Div. plant in Weirton, W. Va.

A contract has been awarded to Mesta Machine Co., Pittsburgh, for a two stand, tandem cold mill which will be powered by about 7000 hp. It will be constructed for an operating speed of 3000 fpm. A contract has been awarded to Wean Engineering Co., Warren, Ohio, for a cleaning, chemical treating, and oiling line.

The new facilities will be housed in two new buildings which will have a combined floor area of about 45,000 sq ft. They will be constructed as an extension of the tin mill. Tin plate will be conveyed directly from the four electrolytic plating lines to the new plant.

• **Production Line** — The material will flow in one direction through the tandem cold mill and in the opposite direction through the cleaning, chemical treating, and oiling line to the coil storage floor. Coils will move from this area to adjacent facilities for cutting tin plate into sheets or bundling for shipment in coils.

Addition of the new facilities will increase Weirton Steel's capacity for production of lightweight tin plate by about 300 per cent, says T. E. Millsop, chairman of National Steel. The corporation's capacity will be further increased by facilities at its new division, Midwest Steel Corp., Portage, Ind., which are scheduled for operation later this year.

Barmaker Boosts Capacity

Precision Drawn Steel Co., Pennsauken, N. J., producer of cold finished, carbon and alloy steel bars, has stepped up capacity 20 per cent to around 70,000 tons annually. Plant additions house additional wire drawing facilities; atmosphere controlled, gas fired furnaces for processing wire; and additional warehousing and pickling facilities.

Furnace Contract Awarded

Selas Corp. of America, Dresher, Pa., will supply the entire furnace equipment required for the combination pipe mill at the Ambridge, Pa., plant of National Supply Div., Pittsburgh, Armco Steel Corp. (STEEL, Feb. 6, p. 66; June 19, p. 73). A total of 54 in-line furnaces will heat preformed skelp for continuous buttweld pipe which will be produced by the stretch reducing process. The same furnaces will also heat electric resistance welded pipe for stretch reducing or sizing and seamless pipe for stretch reducing at an hourly production rate of 80 tons. Line speed through the furnaces will be up to 260 fpm.

Chicago Bridge to Build

Chicago Bridge & Iron Co., steel plate fabricating and construction firm, is erecting a general office building in Oak Brook (Chicago), Ill. Occupancy of the 75,000 sq ft facility is set for early next spring. The firm also has in the planning stage a 26,000 sq ft research laboratory which would adjoin the new building. It would accommodate a weld test section, chemical and metallurgical laboratories, and pilot product models.

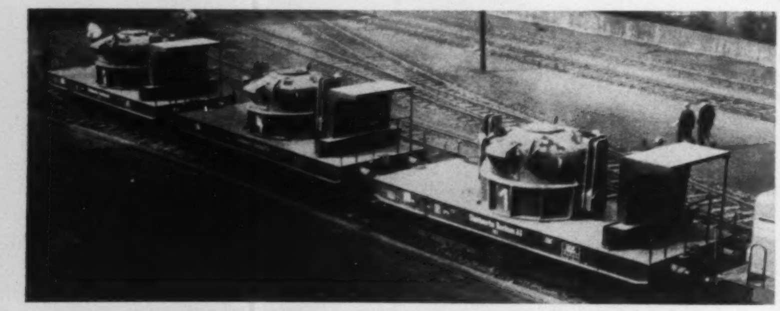
Valley Mould Buys Plant

Valley Mould & Iron Corp., Hubbard, Ohio, acquired the Hubbard Works of Youngstown Sheet & Tube Co. and signed an agreement with Republic Steel Corp. to buy molten iron from it effective July 1. Valley Mould, producer of steel plant ingot molds and stools, has plants at Hubbard, Cleveland, and Chicago.

W. C. H. Ramage, president, says Valley Mould has no plans for immediate operation of the small blast furnace on the newly acquired property, but it will eventually use it for a supplemental iron supply. He points out that the Republic agreement will enable Valley Mould to virtually double production, since shortages of molten iron heretofore were a handicap in its Hubbard plant.

Integrates Facilities

Canadian Allis-Chalmers Ltd. is transferring all electrical equipment production from its St. Thomas, Ont., plant to its Lachine, Que., plant on or about July 28. The St. Thomas Works was acquired in 1950 from Erie Iron Works to manufacture control equipment for diesel-electric locomotives; other electrical equipment production was added later.



Rail Cars Give Hot Metal Long Haul

TEMPERATURE of liquid pig iron drops only about 110° F during a 4 hour haul on a German railroad. Up to 120 tons of hot metal are transported in three, covered ladle cars designed by Siemag Netphen GmbH, Netphen, Sieg.

Ford to Build Coke Ovens

Ford Motor Co., Dearborn, Mich., will dismantle one battery of coke ovens and construct a new battery of 61 ovens at its Rouge Works. Ford awarded a contract to Koppers Co. Inc., Pittsburgh, for Koppers-Becker gas-gun type ovens to be underfired with blast furnace gas exclusively. Construction of the new battery is scheduled for completion early in 1962. The Rouge Works now has four coke oven batteries with a total of 220 ovens, all designed and built by Koppers.

Cleveland Firm Expanding

Addressograph-Multigraph Corp., Cleveland, has awarded contracts for a 42 per cent expansion in manufacturing and storage space at its main plant in Euclid, Ohio. Cost: More than $8 million. The project will take about two years to complete and will include installation of equipment in its plating and painting departments which will be relocated in the plant addition.

Composite Beam Patented

Gregory Industries Inc., Lorain, Ohio, has been granted a patent on the Nelson composite beam. It was issued in the names of R. C. Singleton and R. E. McGinnis, vice presidents. The patent covers steel and concrete composite construction. Studs are endwelded on a metal beam or other base and used as shear connectors to cause the beam or other base and the concrete slab to act as a unit.

NEW PLANTS

Arcair Co., Lancaster, Ohio, is erecting a plant which will triple its facilities. It will provide manufacturing, office, and warehouse facilities and will include enlarged laboratory facilities. The firm makes metal removal and cutting torches and allied equipment.

Drummond, McCall & Co. opened a new head office and distributing center on Fairway Street, Lanchine, Que. The firm distributes steel, aluminum, brass, copper and allied products. Its services include cutting, shearing, and slitting.

SeaView Industries Inc. moved its $250,000 roller strip coating paint line to a new plant in Baltimore. It is being operated by SeaView's subsidiary, International Coating Corp.

ASSOCIATIONS

Wire Reinforcement Institute, Washington, elected D. W. Roberts, Sheffield Div., Kansas City, Mo., Armco Steel Corp., president. Managing director is F. B. Brown.

Drop Forging Association, Cleveland, elected these officers: President, W. A. Carlile Jr., Columbus Bolt & Forging Co., Columbus, Ohio; vice president, W. H. Stocking, Pittsburgh Forgings Co., Coraopolis, Pa.

New address of the **Non-Ferrous Founders' Society** and its product group, **Cast Bronze Bearing Institute,** is Box 1336, Evanston, Ill. Herbert F. Scobie is executive secretary of the society.

NEW ADDRESSES

National Ultrasonic Corp. moved to larger quarters at 95 Park Ave., Nutley, N. J. Additional production equipment is being acquired for the 15,000 sq ft manufacturing area. The office and engineering area covers an additional 3000 sq ft.

National Automatic Tool Co. moved all manufacturing of the Natco-Jes/Cal Co. from Fraser, Mich., to Richmond, Ind., and the sales and engineering office to National's regional sales office at 14119 Puritan Ave., Detroit 27, Mich.

VACATIONS

I-T-E Circuit Breaker Co., Philadelphia, will close all its divisions in that city July 21 to Aug. 7. Emergency requirements will be handled by a skeleton force during the vacation period.

CONSOLIDATIONS

Tuthill Pump Co., Chicago, purchased **Ossian Engineering Co. Inc.,** Ft. Wayne, Ind., producer of hand and electric gasoline pumps. Tuthill manufactures positive displacement rotary pumps.

Continental Copper & Steel Industries Inc., New York, and **Silvray Lighting Inc.,** Bound Brook, N. J., will merge, subject to approval of Silvray's stockholders.

Applied Microwave Electronics Inc., Baltimore, acquired **Service Machine Co.,** that city, and will move the operation to its new, $150,000 plant. Service Machine will be operated as a subsidiary.

Portomag Inc. and its **Di-Cor Div.,** Ferndale, Mich., merged with **General Automation Co.,** Detroit, to form a new company, General Automation Mfg. Inc. The new firm has its plant and offices at 1200 E. Maple Rd., Troy, Mich. It produces diamond drilling bits and machines and special automated machinery and equipment. Officers include: President, R. R. McLeese; vice president-marketing, R. S. Ebbert; vice president-engineering and manufacturing, H. C. Ovshinsky.

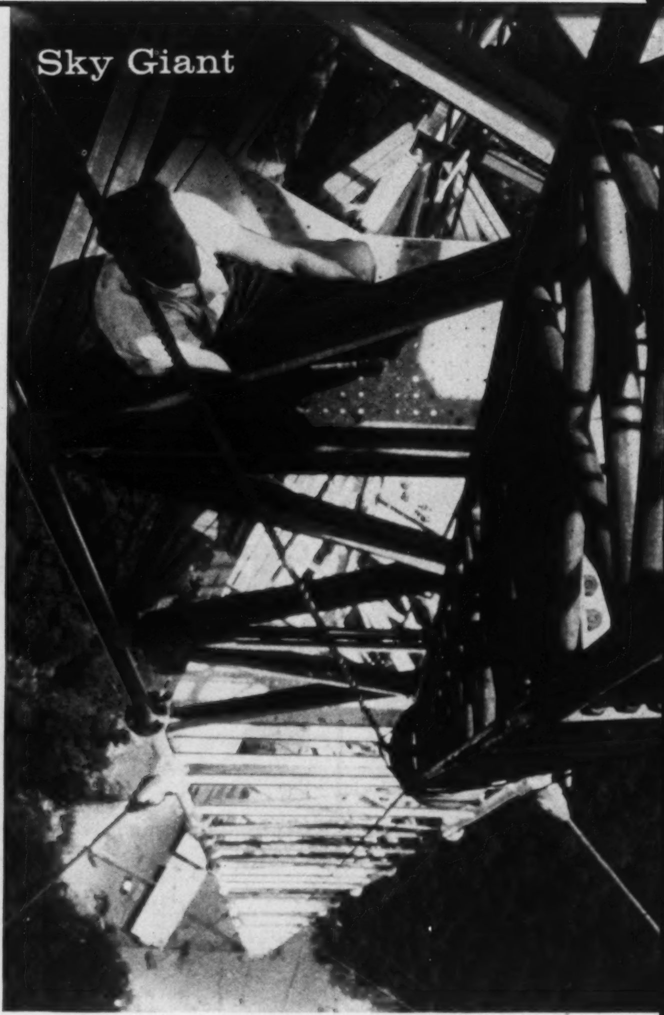
NEW OFFICES

Duraloy Co., Scottdale, Pa., opened a sales and engineering office at 4101 San Jacinto, Houston 4, Tex. The firm makes static centrifugal and shell molded, high alloy castings.

Harvey Aluminum, Torrance, Calif., opened a branch office at 3691 Lee Rd., Shaker Heights (Cleveland), Ohio.

Hevi-Duty Electric Co., Watertown, Wis., opened a Boston district sales office at 368 Washington St., Dedham, Mass. Stuart D. Walker has been appointed district manager. The firm is a division of Basic Products Corp., Milwaukee, and manufactures industrial furnaces and ovens, laboratory furnaces, transformers, and constant current regulators.

Earth Giant



Two more extraordinary welding jobs done with M&T Murex Electrodes

THIS 6,588,000-LB. SHOVEL on the 50-yard line of a football field could dig a 65 cu. yd. dipperfull in one end zone, lift it 140 feet high, swing its 170-ft. boom and pile the 100 ton load atop a 12-story building in the opposite end zone.

THE TALLEST MAN-BUILT STRUCTURE, the new transmission tower for KFVS-TV, Cape Girardeau, Missouri has equally impressive statistics. It stretches 1676 feet skyward. Weighing 1000 tons, it has solid steel legs up to 7½" thick, can withstand over 100-mph winds.

Joint integrity is an absolute requirement for a shovel that chews up huge bites of earth...or a tower built to be buffeted by hurricane-force winds. Isn't it significant that welding on these giant jobs was done with M&T Murex electrodes? The electrode that's good enough to meet these requirements is certainly good enough for everyday jobs too.

Yet you get even more than a quality product with M&T Murex electrodes. You get reliable technical service from trained welding specialists. These men are well qualified to help you select the proper type from one of the broadest lines of electrodes—over 1000 types and sizes.

So call in the M&T man for details or recommendations. Or send for a copy of the Murex Electrode Selector.

M&T

welding products · plating products
minerals · coatings · chemicals · detinning

METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

July 3, 1961

Technical Outlook

ATOMIC STEP FORWARD— Mechanical removal of metal cladding on atomic fuel elements has been reported by the Oak Ridge National Laboratory, Oak Ridge, Tenn. Significance: Processors can remove highly reactive sodium potassium inside the tubes before the uranium is dissolved in chemicals.

HARDIER BORES— Putting a wear resistant iron surface on aluminum cylinder walls of aluminum engines is simpler and less expensive with a method developed by Doehler-Jarvis Div., Toledo, Ohio, National Lead Co. Iron particles are sprayed on cylinder cores. During the casting shot, the particles embed themselves and impregnate the cylinder wall. Only honing is needed for finishing. Cost: Less than half that of cast liners. First use will be in small two cycle engines.

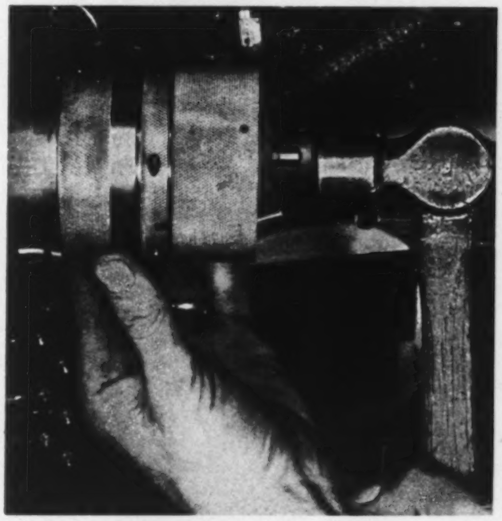
BIG POWER IN LITTLE PACKAGE— Continuous high power is provided by a portable device filled with rocket propellent. It's easily controlled and can be employed to make cool gas at 3 to 3000 psi, as an auxiliary power system for pneumatic tools, or as a reaction device (rocket engine) to propel men in space. Propellent cartridges are replaceable. The device can be turned on and off as many times as necessary.

TAPE CONTROLLED INSPECTION— A new, 16 ton system built by Sheffield Corp., Dayton, Ohio, can make 1000 precise measurements of complex parts in 2 hours. It would take months to do the same job conventionally, the firm claims. The device makes inside, outside, and thickness measurements of any shape. Styluses can detect variations of point position or angle to less than 0.0001 in. and thickness changes of half that amount (0.00005 in.).

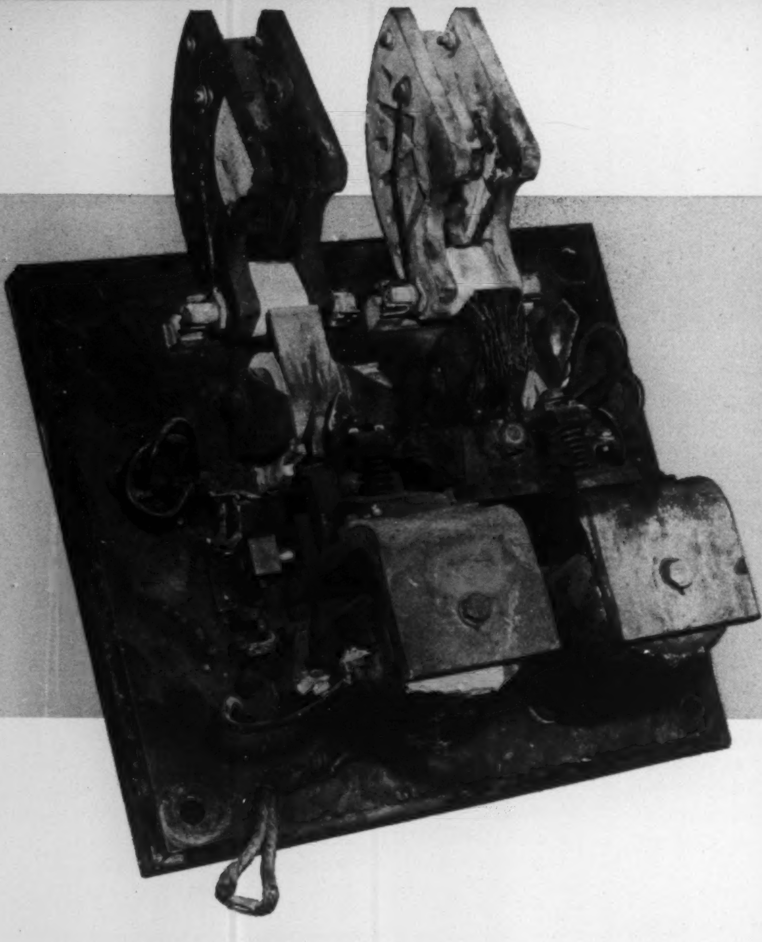
INDUSTRIAL DIRECTION SIGNS— "We will use more physicists and chemists specializing in processing to support design and manufacture," states James N. Davis, deputy assistant secretary of defense. Reason: Problems relating to such things as electrochemistry of metals, flow and memory of plastics, and residual impurities in cleaning and processing escape the engineering designer. The prediction is also based on the need for tighter manufacturing controls and a recognition of the limitations of statistical sampling methods, he states.

DESIGNER'S DREAM— The ultimate goal in the production of tapes for numerically controlled machines: They will be based on design information concerning the function of a part instead of its dimensions. That's the opinion of Gen. Orville Cook, president, Aerospace Industries Association of America Inc. He believes the approach will greatly speed and improve the design process.

BETTER GRAPHITE CLOTH— Continuing research has tripled the strength and doubled the flexibility of graphite cloth, states National Carbon Co., a division of Union Carbide Corp., New York. The material is being tested for use in high temperature rocket engines.



TUBES EXPANDED EXPLOSIVELY— A small, hand held, die mechanism developed by Rohr Aircraft Corp., Chula Vista, Calif., employs a small cartridge to make tubular joints in hard to reach areas. The firm will market the tool.



Ninety per cent of stationary equipment horsepower is furnished by electric motors. If controls look like this, you're in trouble. Here's how to . . .

Get the Most from Electrical Controls

• PROPER MAINTENANCE of electrical control devices is the continuing phase of three steps necessary for troublefree service, says Allis-Chalmers Mfg. Co., Milwaukee. The other two: Proper application and an adequate electrical system.

Failure to recognize and correct early symptoms of trouble starts a chain reaction which ends in excessive maintenance costs, or even complete replacement. The company recommends a checklist and suitable report form to assist service personnel; checking electrical control equipment should be a job for skilled workers who are familiar with the equipment and its hazards.

Safety is one of the watchwords. It includes the driven machines, as well as the electrical equipment, when the periodic checks are being made.

• Says Allis-Chalmers: A regular inspection schedule will pay off in savings in replacement parts and machine downtime.

As part of the inspection, dust, dirt, and grease should be removed from the controller. Dust can cause a mechanical failure, and it may form a path between high and low potential points, producing a short circuit.

Dry dust can be blown off. Sticky dust and grease take solvents, but solvents should not be permitted to soak the coils.

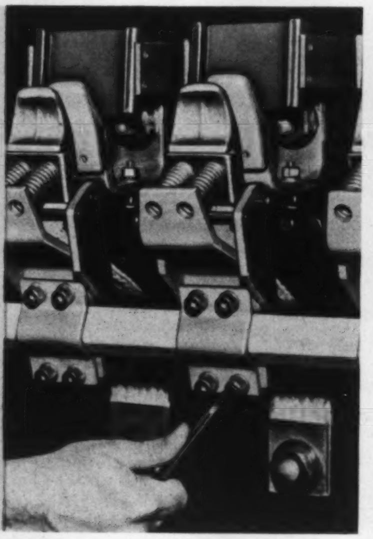
Rust and corrosion can be taken care of during other phases of cleaning. Overload relays are a case in point. Few plants, says Allis-Chalmers, test the overload relay as part of their maintenance program. Since the relays function only in case of trouble, they may not have to operate for months or years. But the relay has moving parts, which are subject to sticking from an accumulation of dirt, rust, or corrosion. If the relay does not trip on an overload, a burned out motor can result.

• After cleaning, a check should be made on the mechanical parts of the contactor.

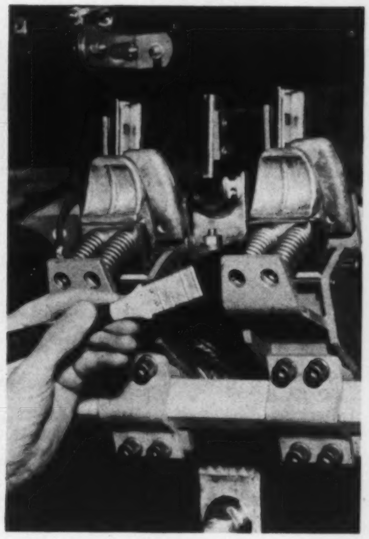
Moving parts of the contactor should be checked for excessive friction, Allis-Chalmers notes. They should be tried by hand, checked for loose pins or bolts, and examined for excessive wear that could cause misalignment or overheating.

Oil or grease isn't always beneficial. For example: Some bearings are designed for operation without lubrication.

Loose connections may develop at any time. So control connections and main line connections

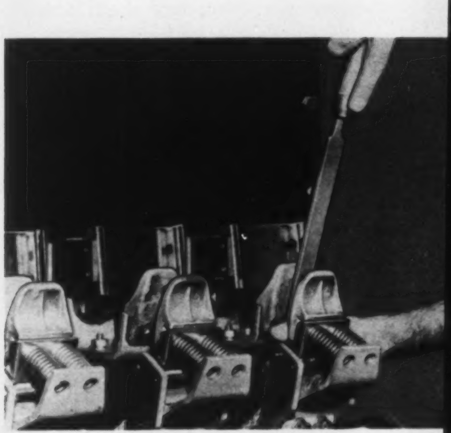


Simple steps: Tighten screws . . .

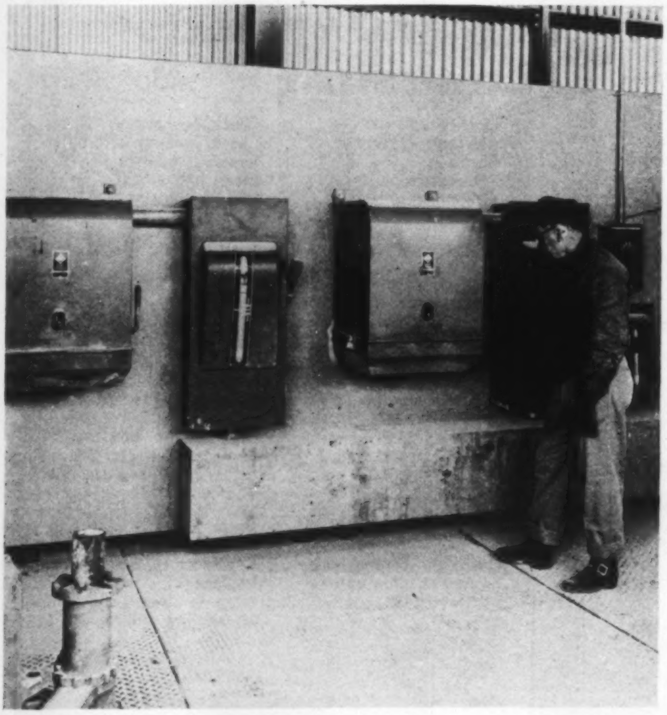


Brush out dust . . .

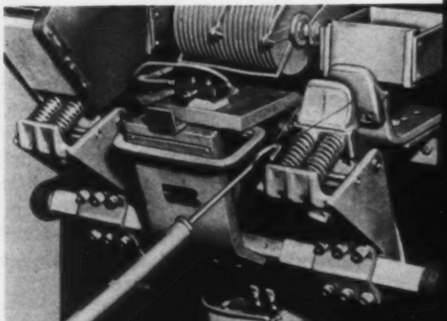
Clean with solvent . . .



File tips smooth if rough . . .



For dusty areas: Sealed enclosures



Check springs with scale

should be checked.

Overheating of any part is a danger sign. The term is relative, though, since some coils (such as blowout coils) and other parts may operate regularly above the boiling point of water. The danger indication is any evidence of baking or smoking.

The resistance between the cables and conduit and ground should get a periodic check too. It's particularly important if there is a chance that water can get into the system.

• Springs and contacts of contactors need frequent checking.

Some pitting of contacts is normal. Any deposits should be removed with sandpaper or a fine file. As with other electrical equipment, emery paper should not be used. The original shape of the contacts should be maintained; if it can't be done without making them too thin, they should be replaced in sets with new ones.

Too frequent dressing of contacts only cuts their life without improving their operation, Allis-Chalmers warns. Although copper oxide, which is an insulator, should be removed, silver contacts need not be filed unless they are severely roughened.

Screws holding the contacts in place should be kept tight.

Springs maintain the proper contact pressure in controllers. As the contacts wear, the spring pressure decreases. Under usual conditions, pressure remains within satisfactory levels, but if the contacts wear too thin, pressure drops enough for overheating to occur. Replacing the contacts may solve the problem, but not if the spring has been softened by the overheating. A soft spring will not produce enough pressure to prevent further damage. The best way to test is with a scale, but a rough check can be made by comparing with finger pressure if only one or two of the springs have softened.

Many plants feel it is good insurance to replace springs whenever contacts are replaced.

• Other operating parts are less likely to require repairs.

Coil burnouts, which used to be common, are rare today. New

Control Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSE	CURE
MANUALLY OPERATED CONTROLLERS		
Excessive contact burning	Low contact pressure	Adjustment by inspection
	Contacts misaligned	Drum controllers — adjust finger to strike contact squarely
Burning out resistors	Sequence stopped at midpoint	Instruct operator
Failure to pick up	Low coil voltage	Check system
Failure to hold in	Coil burned out; wrong coil	Replace
	Excessive magnet gap	Check gap
Failure to drop out	Mechanical binding	Clean and adjust
	Contact welded	See CONTACTS
	Voltage not removed	Check circuit
THERMAL OVERLOAD RELAYS		
Failure to trip	Wrong size heater	Check instruction sheets
	Mechanical binding	Clean and adjust
	Relay damaged by shorts	Replace relay
	Motor and relay in different ambient temperatures	Install in uniform temperature
Trips at too low current	Wrong heater	Check instruction sheets
	Heater assembled incorrectly	Check instructions
	Heater in high ambient temperature	Install near motor or in cooler place
	Wrong calibration	Refer to manufacturer
Trips on starting	Motor starting cycle too long	Refer to manufacturer
Failure to reset	Broken mechanism	Replace part or relay
Burning of relay contacts	Short circuit	Check pushbutton wiring
	High coil current	Check holding coil current
	Vibration	Remount control
	Dirt, corrosion	Clean and adjust
	Misapplication	Use interposing relay if coil current too high
CONTACTS		
Short contact life	Interrupted current too high	Special tips, next larger contactor
	Oil immersed when air should be used	Use air break unit, or next larger coil
	Bounce on opening or closing	Readjust contactor
	Abrasive dust	Dust-tight enclosure
	Low contact pressure	Replace contacts or springs
	Frequent jogging	Larger size contactor
Contact chatter or pumping	Poor control contact	Check control circuit connections
	Fluttering control relay	Repair or replace pilot device
	Broken shading coil	Replace
	Bad interlock	Increase wipe and pressure on sealing interlock

SYMPTOM	POSSIBLE CAUSE	CURE
Overheating	Copper oxide	Clean lightly with file
	Continuous heavy load	Use silver alloy tips
	Overloaded	Reduce load; use larger control
	Weak contact pressure	Replace contacts or springs
	Poor connection	Tighten
Weak pressure	Worn tips	Replace
	Poor adjustment	Readjust gap and wear allowance
	Low voltage, magnet not sealing	Correct voltage, use lower voltage coil
Welding of contacts	Poor spring pressure	Replace
	Abnormal currents	Less current, larger device; nonwelding contact tips
	Repeated jogging or inching	Use next larger device or jog slower. Special tips
	Low voltage-contact drops part way open	Raise voltage
	Bouncing of contactor	Readjust; eliminate over voltage

COILS

Open circuit	Contacts not sealing	Eliminate mechanical binding
	Failure to insert protective resistor (d.c.)	Interlock not making contact—repair
	Mechanical injury	Replace coil; improve practice
	Very rapid jogging	Check application
	Short-time coil energized too long	Check timing sequence
	Overvoltage; high ambient temperature	Check circuit and application
Coil failure	Moisture or corrosive atmosphere	Special coils

SLIDING CONTACTS: Rheostats, Knife, and Drum Switches

Overheating	High current, weak contact pressure	Dress copper contacts; use special alloy. Lubricate as specified
Excessive burning	Rapid lever operation	Operate slower to eliminate starting across the line
Irregular surfaces	Lack of maintenance	Smooth contacts; lubricate
Abrasion	Lack of lubrication	Apply light coat of Vaseline

MAGNETS

Noisy	Low voltage	Raise voltage, or use lower voltage coil
	Broken shading coil	Replace coil. New magnet frame if face of magnet is worn
	Dirt	Clean. Lubricate with good grade of white machine oil
	Misalignment	Realign
Failure to open	Grease on magnet surface	Clean
	Misalignment	Realign
	Contacts welded	See CONTACTS

methods of impregnation eliminate most of the effects of moisture and vibration, the major sources of coil damage.

If an alternating current coil burns out, a check should be made for mechanical blocking or binding. The open magnet has a high value of in-rush current—enough to cause burnout if the magnet does not close properly.

Flexible leads are moving parts too. If some of the strands break, the load on the remaining ones is increased. When replacing the flexible leads, longer service life can be obtained if they are shaped by hand to take the flexing over their entire length rather than in a small section.

Arc shields should be cleaned if they are severely coated with copper or carbon deposits.

Some controllers have dashpots, which may use air or oil. They should be checked for binding. Only special dashpot oil should be used.

Special tests are needed for the insulating oil used in high voltage, oil immersed contactors.

• Finding the cause of trouble may take real detective work.

Tampering with the contactor may be a problem. In one foundry, a number of grinder motors burned out for no apparent reason—it was finally learned that the motors were being overloaded on one shift. So the breakers tripped frequently. To prevent that, the workers put an air hose in the starter to keep the breakers cool, which kept the breakers from tripping—but the motors were overloaded and failed.

In a cement mill, one starter was installed below a cement hopper. Cement dust clogged the starter, causing frequent burnouts. In another installation, the starter was mounted on a wall next to a furnace. The high ambient temperatures caused frequent tripping of the overload relays. And in yet another case, mounting the starter on a wall which vibrated because of nearby equipment caused frequent tripping of the overload circuits. Correcting the conditions made for longer service life.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Fundamental research, recent tests encourage experts . . .

CO_2 Welding Gets 'Quality' Tag

• CARBON DIOXIDE welding promises to be one of the most versatile of all the arc processes.

That's the opinion of P. J. Rieppel, chief, Metals Joining Division, and his associates, M. D. Randall, principal welding engineer, and S. J. Hoyt, consultant, Battelle Memorial Institute, Columbus, Ohio.

Mechanical properties of such welds in stainless and low alloy steels are frequently better than their counterparts made with the submerged arc technique, or coated, manual electrodes. Reason: Fewer inclusions of globular silicates—75 per cent less, in fact, than those found in typical submerged arc deposits.

CO_2 shielded arcwelds also have greater resistance to hot cracking, says. Mr. Rieppel. Reason: Oxidation drops the sulfur and phosphorus content of the weld.

A third advantage: Extremely low hydrogen content, which improves mechanical performance in cold climates. Experts aren't sure why, explains Mr. Rieppel. It may be that, like sulfur and phosphorus, the hydrogen is oxidized, but it is more probable that it's the absence of fluxes and coatings which can be troublemakers where hydrogen is concerned.

• The process employs a continuously fed wire. The arc and molten pool are shielded from the air by a blanket of carbon dioxide. Four questions are commonly asked: 1. How is severe oxidation avoided? 2. How does carbon dioxide affect mechanical properties? 3. What happens to alloying elements during welding? 4. What materials can be welded? Here are some results of Battelle's survey.

Experiments on the oxidizing effects of carbon dioxide gas have shown that porosity can result if the composition of the filler metal is improperly adjusted. In an arc, some 57 per cent of the carbon dioxide is reduced to carbon monoxide. Under such conditions, enough manganese and silicon (or other deoxidizers like aluminum and titanium) must be available to deoxidize the weld metal. (The failures of early investigators to achieve sound welds are attributed to that fact.)

In general, Battelle experts point out, operators must remember that increasing arc length ups oxidation losses, probably through increased exposure. By increasing current and reducing travel speed, you can increase the effects of the base plate composition on weld deposits and increase penetration.

• Tests for National Cylinder Gas Div., Chemetron Corp., Chicago, show that generally, mechanical properties of CO_2 welds are similar to those of other gas or flux shielded welding processes.

The bottom table shows the results of those tests. Tensile specimens of weld metal were 0.505 in. in diameter. They clearly show a slight superiority of the CO_2 welds, and they are typical for mild or structural grades of steel. Stainless and low alloy welds are similar and in some instances better than those made by submerged melt or coated manual electrodes.

Cleanliness is probably a big reason for improved properties, say Battelle experts. Complex silicate inclusions are only one-fourth as great in CO_2 welds compared with those made by other methods. In addition, the globules themselves are apparently much smaller.

• Alloy losses approximate those of other processes and can be adequately anticipated by adjusting the compositions of base metal or welding wire.

For comparison, the Battelle experts point to the considerable amount of work that has been done to determine the efficiency of element transfer across an arc. Principal results:

1. Transfer efficiency of carbon depends on carbon content of the base plate and filler wire. Deposits in low carbon steel contain more carbon than the welding wire; in higher carbon steels, carbon content is reduced.
2. The CO_2 arc oxidizes both silicon and manganese; the amount decreases as element quantity increases.
3. Operators will find no loss of chromium or nickel.
4. Half the titanium (contents up to 1 per cent) is lost in a CO_2 shielded arc. With higher contents, the losses decrease—the total generally doesn't exceed 30 per cent.
5. Best transfer efficiencies, highest to lowest are: A. Solid wire in argon-oxygen. B. Coated manual electrode. C. Solid wire CO_2. D. Flux cored electrode in CO_2.

• Russians and other Europeans have done considerably more fundamental research on carbon dioxide shielded welding and the metals it will handle than we have.

You can make sound welds with good mechanical properties in a variety of steels—plain carbon, austenitic stainless, heat resistant and low alloy, high strength. You need suitable filler wires to compensate for oxidation losses.

Carbon dioxide shielded arcwelds have high resistance to both hot and cold cracking. Researchers believe that it is due to the oxidation (loss) of hydrogen, sulfur, and phosphorus.

The process can join plates up to 7 in. thick with high deposition rates, good weld appearance, and comparatively few inclusions.

CO_2 Is Low Hydrogen Welding

Process	Amount of Hydrogen (Milliliters per 100 grams)
Carbon Dioxide	0.15
Argon, Metal Arc	0.7
Submerged Melt	2.7
Low Hydrogen, Manual Electrode	3.6
Ilmenite Coated Electrode	21.9

Source: Sekiguchi and Mesumoto, Welding Journal.

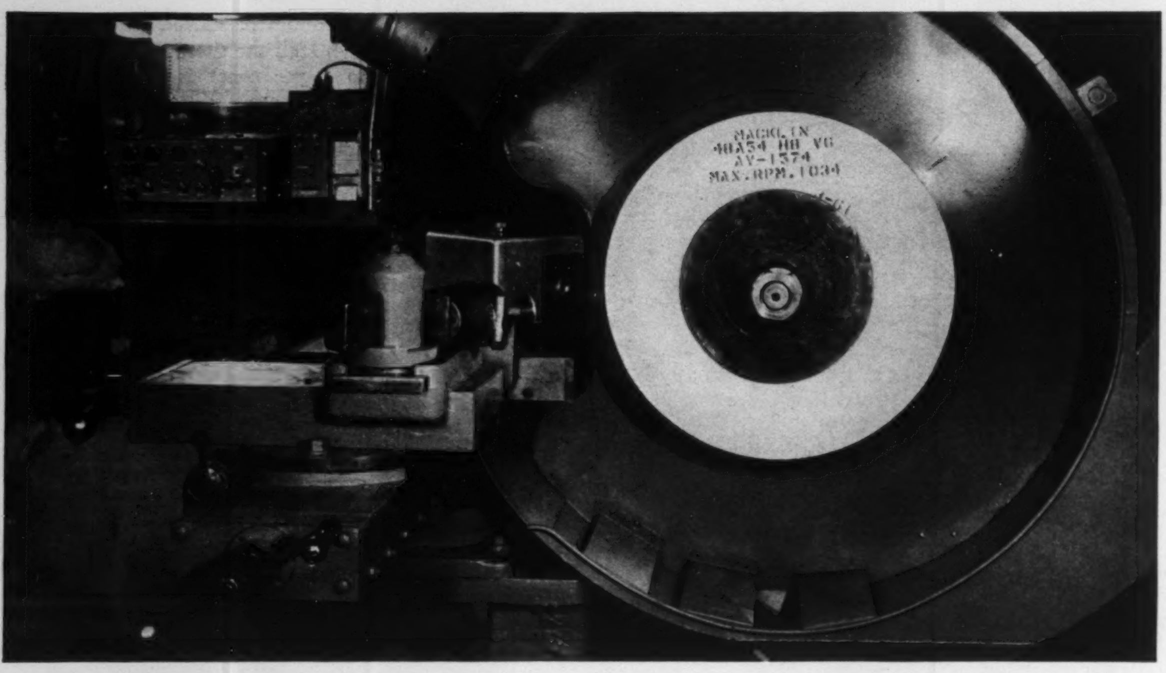
Mechanically, CO_2 Welds Are Sound

Gas	Yield psi	Ultimate psi	Elong. in 2 in. (%)	Red. of Area (%)	Notch Toughness, Foot-pounds	
					75° F	0° F
CO_2	54,300	68,100	32	64	40	39
Argon	52,250	67,400	36	65	47	39

High Strength Aluminum Castings Alloy Offered

PRODUCTION of aluminum castings with tensile strengths up to 50,000 psi, it's claimed, may be made under normal foundry conditions through use of an alloy offered by Reynolds Metals Co., Richmond, Va. Designated Tens-50, the alloy was developed for use in critically loaded aircraft and missile structures by the Los Angeles Div. of North American Aviation Inc. It may be used for any application demanding high strength and low weight.

Reynolds Metals has been licensed by North American's marketing subsidiary, Navan Products, to manufacture and sell the alloy. It will be produced at Jones Mills, Ark. Tens-50 castings have the following typical mechanical properties: Sand castings: tensile strength 47,000 psi, yield strength 38,000 psi, and elongation of 4 per cent. Permanent molds: tensile strength 53,000 psi, yield strength 43,000 psi, and elongation 7 per cent.



A thin walled cone crushes a grinding wheel. The . . .

Test Checks Grinding Performance

• A NEW TECHNIQUE for evaluating the hardness of grinding wheels may help penetrate a couple of barriers in the technology.

First, grinding wheel manufacturers may be able to get new information about their products.

Second, finite measurements of wheel hardness, independent of spring in the machine and other grinding variables, could lead to industry standards. The idea is being discussed and worked on.

Third, further studies with the hardness measuring system can help the grinding wheel user to better predict chatter conditions, to determine the effect of machine rigidity on grinding results, to predict differences in performance of a grinding wheel on different machines, and to know how a grinding wheel will behave under different grinding conditions.

• The hardness test consists of crushing small amounts of abrasive from the wheel surface and measuring the reaction forces on the crusher.

A cutter or crushing wheel consisting of a 90 degree conical cup with a 0.1 in. thick wall is mounted on a free running spindle. The spindle is mounted on a two-component lathe dynamometer, which, in turn, is fastened to the cross slide of the lathe. The dynamometer measures both vertical and horizontal forces. The crusher is set to the right depth of cut, then fed across the face of the abrasive wheel that's mounted on the lathe spindle.

The measured horizontal forces are then plotted against corresponding feeds and depths. (The vertical force is negligible.) The plots then can be interpreted in terms of relative hardness. So different type wheels can be compared on the same scale, and the effect of differences (such as grain material or size, bond, and wheel speed) can be determined.

• One maker of grinding wheels is using the test for inspection and quality control.

Macklin Co., Jackson, Mich., worked with the University of Michigan on the development of the technique. Macklin's R. O. Lane, vice president and director of research, says his company is using the test for inspection and quality control of the grinding wheels it makes.

He cites an example of the test's worth. A customer returned a wheel, claiming it was defective. All other checks indicated it was good. The hardness test showed, however, a variation within the wheel that might have caused the problems. The dynamometer test is helping Macklin eliminate that kind of variation from its grinding wheels.

Here is a plan to help you

REDUCE SUFFERING AND TRAGEDY

With it, your company can **SAVE PRECIOUS LIVES,** *while* **CUTTING COSTS DUE TO ABSENTEEISM** *by as much as 1/3 to 1/2!*

Together, American management and labor have done a remarkable job of reducing the incidence of industrial accidents. In-plant safety campaigns have been so effective that today it is *nonwork accidents* that cause the bulk of lost lives and manhours in our economy.

The National Safety Council has developed a plan to reduce these accidents. Not only will it save lives and prevent crippling injuries, but it will add significantly to the efficiency and net profits of companies which put it into operation.

Let's say you're an average company or corporate unit doing $1 million in sales a year. Your net is around $73,000. National Safety Council figures show that the average nonwork accident costs employers about $72. (You can determine *your* costs with the Council's new nonwork accident report system.) Ten such accidents can cost $720—or about 1% of your net profit. Prevent those accidents and you can *add 1% to your net!* Prevent twenty—and add *2%* to net!

Experience shows that a reduction of nonwork accidents by 30% is possible! One large company with an excellent in-plant safety record has *cut nonwork accidents by ⅓* with its off-the-job safety program! It's employee's rate for motor vehicle fatalities stands *85% below rate for all U.S. workers!* And its already low *in-plant accident rate came down 50 per cent!*

Here is a rewarding endeavor that pays immeasurable dividends in human and employee relations—as well as an important untapped source for cost control. You can institute this kind of program in your company. Send the coupon for a copy of our booklet "The Challenge to Management of Off-the-Job Accidents." It will show you how to determine your non-work accident costs, as well as many tested ways to reduce this steady waste of lives and profits. Send the coupon today.

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Why Steel Companies Adopt The Basic Oxygen Process

• AVAILABILITY of a growing range of steels from basic oxygen furnaces is promoting popularity of the pneumatic process—which has already made its mark because of its relatively low capital and operating costs.

Steelmen were told why three major steel producers chose the process for added ingot capacity or replacement of obsolete open hearths at a meeting of the Metallurgical Society, American Institute of Mining, Metallurgical & Petroleum Engineers (AIME) in Philadelphia.

New facilities—expected to be in operation during the coming year—were described by representatives of Jones & Laughlin Steel Corp., Colorado Fuel & Iron Corp., and Great Lakes Steel Corp., a division of National Steel Corp.

• The oxygen process will augment open hearth tonnage and produce steels of the same analyses in one installation.

Products of the Pueblo (Colo.) plant of Colorado Fuel & Iron Corp. include rimmed steel with 0.05 per cent carbon or less for wire; intermediate grades (0.30 to 0.50 per cent carbon) for seamless tubing; and higher carbon steels (0.60 to 1.00 per cent) for rails, fastenings, and grader blades. "Rolling schedules in our two blooming mills call for a continuous supply of steel in all the grades," says George Grosvenor, open hearth superintendent at Pueblo, "so our new oxygen shop must produce the same steels that are made in the open hearths."

Present plans: Production of 100,000 net tons of steel per month in the open hearth shop, and 50,000 tons a month in the oxygen furnace facility. The basic oxygen shop will employ two, 100 ton shells—one will operate while the other is on standby, or being relined.

An increase in pig iron production from the plant's four blast furnaces will bring output to 110,000 tons a month. That will help meet the increased demand for hot metal.

• Use of the process in one plant is leading one company to install oxygen vessels in another shop.

Two basic oxygen furnaces are about ready at the Cleveland Works of Jones & Laughlin Steel Corp. "The decision to install oxygen furnaces at Cleveland was based on experience with two of the vessels at our Aliquippa Works," says J. A. Glasgow, open hearth superintendent at Cleveland Works. The company concluded that a basic oxygen shop will produce high quality ingots at a lower unit cost.

The two new shells will produce 200 tons of steel an hour, in 200 ton heats. They will replace eight obsolete, 175 ton open hearths.

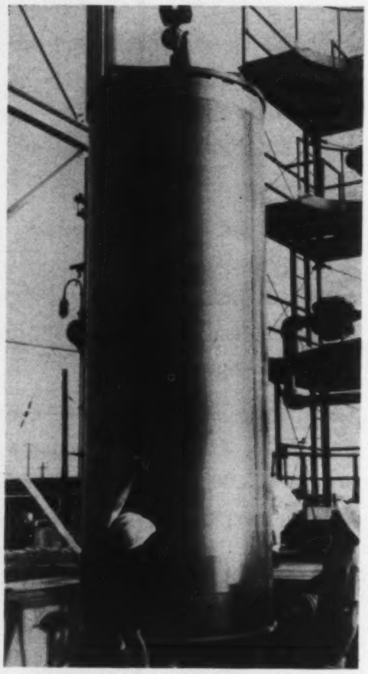
An electronic computer (similar to the one in use at Aliquippa) will be used by furnace operators to calculate proper proportions of hot metal, scrap, and fluxes to be charged into the furnaces and to tap the several grades of steel at the right temperatures.

• Scaled up vessels and auxiliary equipment will permit one producer to make big ingots and use present processing facilities.

Installation of two, 300 ton basic oxygen furnaces at Great Lakes Steel will extend diversification of the division's product mix, and reduce fluctuations caused by seasonal demand from the automotive industry.

Adoption of the basic oxygen process in preference to open hearths was justified by lower capital expenditures and an expected reduction in operating costs, says Richard B. Morgan, assistant superintendent in the division's No. 2 open hearth shop. But the decision to install extremely large furnaces was influenced by the need for ingots weighing up to 35 tons and the desirability of using present equipment, including 300 ton teeming facilities. Feasibility of the large vessels was determined by extrapolation of data from contemporary furnaces that are turning out 100 ton heats.

The new shop, which is expected to turn out steel sometime in 1962, is designed to accommodate a third vessel. A computer will be used to determine charge material weights, improve end point temperature control, and log process data. The computer may eventually be modified for closed loop process control.



A-3 Polaris May Be Glass

THIS 14 BY 4.5 FT rocket motor chamber, made of glass fiber, has been successfully test fired, reports Aerojet-General Corp., Azusa, Calif. And if the company's plans work out, most of the A-3 version of the Polaris missile (range: 2500 mi) will be glass too. The A-1 Polaris, which is operational, is steel. The A-2 version's second stage is glass. The A-3, to be ready in 1964, will double present ranges.

METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

JULY 1961

MAKING MORE PERFECT METALS -- Vacuum melting is meeting the higher property requirements of space and atomic uses. This young, growing industry is producing steels and superalloys with better properties than those melted in air. These vacuum-melted alloys have better ductility, impact strength, fatigue strength, and rupture and magnetic properties. Vacuum melters are also making superalloys and ultra-pure metals that cannot be melted in air. These metals and alloys have produced impressive results. Ball-bearing life has doubled. Jet engines operate longer at higher temperatures. Nuclear reactors can run efficiently.

* * *

ALLOYS FOR VACUUM MELTING -- Union Carbide Metals supplies a complete range of ferroalloys and metals for steels and superalloys melted by both major vacuum-melting processes. In vacuum-arc melting, an air-melted electrode is remelted to improve purity and uniformity. Ferroalloys must be added during air melting since vacuum-arc melting does not allow alloy adjustments. In vacuum-induction melting, alloy additions are made in the vacuum furnace. Metals such as "Elchrome" electrolytic chromium and "Elmang" electrolytic manganese are desired for such additions because of their purity. For more information, call your Union Carbide Metals representative today. Also, ask for the article, "Making More Perfect Metals," in the Summer 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

ULTRA-PURE METALS, TOO -- UCM also offers ingots of columbium, tantalum, and vanadium metal made by a new vacuum process -- electron-beam melting. The electron-beam process provides the purity needed to make these metals ductile and easily formable. All three metals have one property of wide interest to metallurgists -- high strength at elevated temperatures. Thus, they may be the key to future hypersonic flight vehicles. The three metals also resist corrosion. In fact, tantalum chemical equipment resists both oxidizing and reducing media better than most other materials. Columbium effectively resists molten salts. Other properties: columbium and vanadium have moderate neutron cross-sections, allowing use in nuclear reactor structures. Tantalum has ideal dielectric properties for electronic capacitors. Your UCM representative can give you further information and literature on each of these metals.

* * *

UNIQUE VACUUM PROCESS...BETTER ALLOY ADDITIONS -- In the world's largest vacuum furnaces at Marietta, Ohio, UCM eliminates certain hard-to-remove elements from ferroalloys and metals. They aren't removed by melting. They are removed by refining in the solid state. For example, carbon is virtually eliminated from "Simplex" ferrochrome, allowing carbon-free additions to stainless steel. Gases are removed from "Elchrome" VG chromium metal. Thus, less gas is evolved when the metal is used in vacuum-induction melting. Also, nitrogen is added to certain chromium and manganese alloys...for convenient nitrogen additions to stainless steel. Learn more about this unique vacuum process by writing for the article, "The Silent World of SIMPLEX," in the Summer 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

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For Quality and Economy Use

MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

Simple loading is one reason why...

Double Disc Grinder Boosts Output Tenfold

• A DOUBLE disc grinder made possible a tenfold increase in the production of precision aluminum plates for a missile application at Ford Instrument Co., a division of Sperry Rand Corp., Long Island City, N. Y. Other advantages include lower costs, improved part accuracy, and a reduced rejection rate.

The aluminum plates are used as walls for a gearbox that houses components for tracking computers. Critical dimensions require that three walls be flat and parallel within 0.003 in. Wall thickness is 3/16 in. The plates may be as large as 14 x 18 in.

• Using the double disc grinder, a plate can be produced in less than a minute.

Quick, easy loading is featured on the unit (Model 2H30, made by Gardner Machine Co., Beloit, Wis.). The operator simply places the work in the blade of a roller gun type fixture. The part is free floating between two grinding discs, and it can be ground on two sides simultaneously.

• The company uses the process whenever flatness and parallelism are critical.

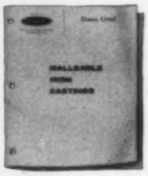
Example: Grinding of cam masters now takes about 3 hours vs. about two days formerly. A skilled technician had to hand scrape, face, and check them. Production of more than 2000 cams has paid for the grinder several times, Ford reports.

Malleable Puts More Muscle in Machinery

In the agricultural equipment field, reputations depend on building products that can take rough treatment . . . and give real value. To do it, agricultural equipment manufacturers rely heavily on Malleable iron castings.

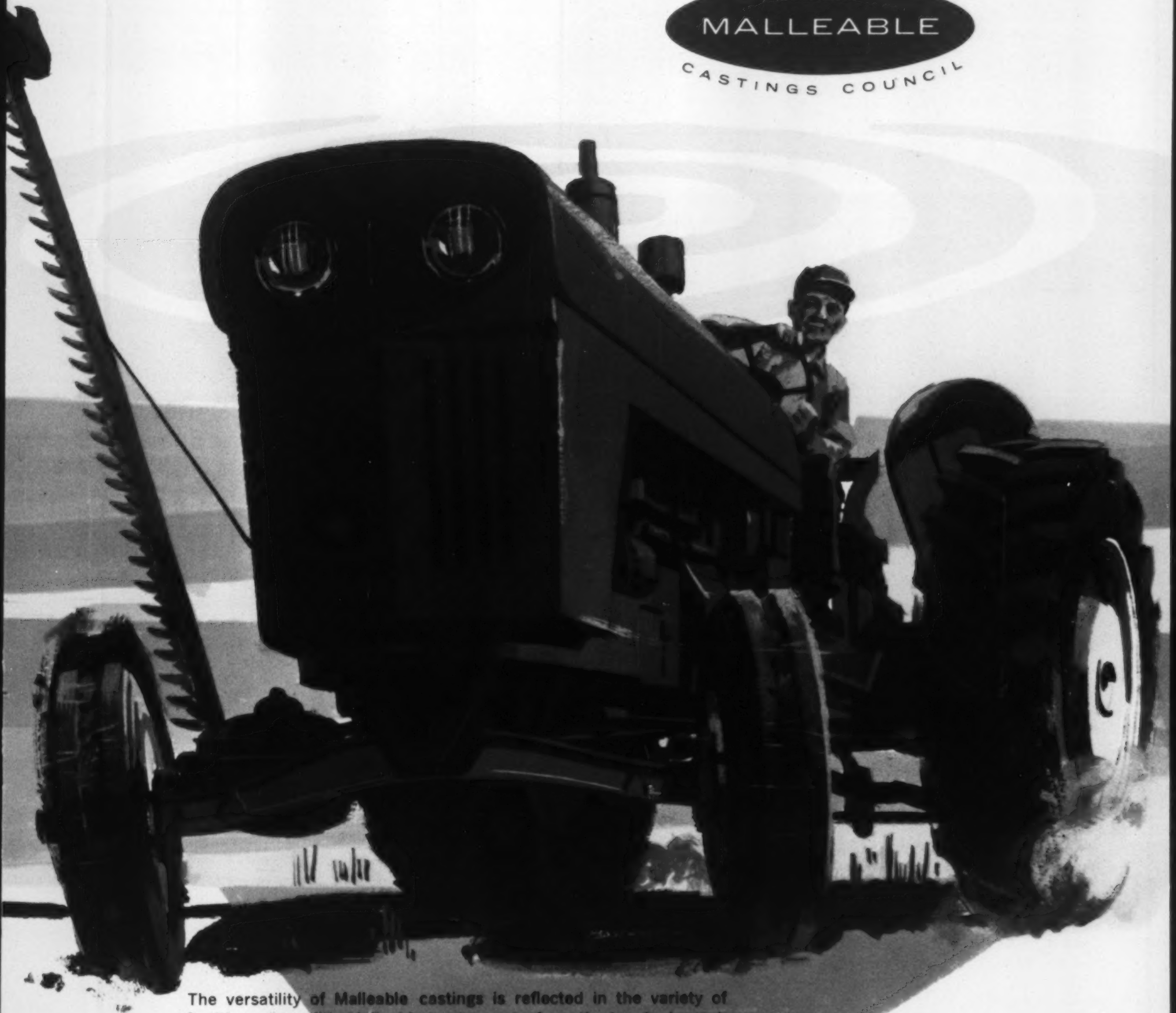
Malleable's excellent ductility and shock resistance mean longer life and fewer problems than obtainable with fabrications. Low start-up cost for small quantities also is vitally important in this competitive industry.

Put more reputation-building quality into your products at less cost with Malleable. For design assistance or quotations, call any company that displays this symbol —

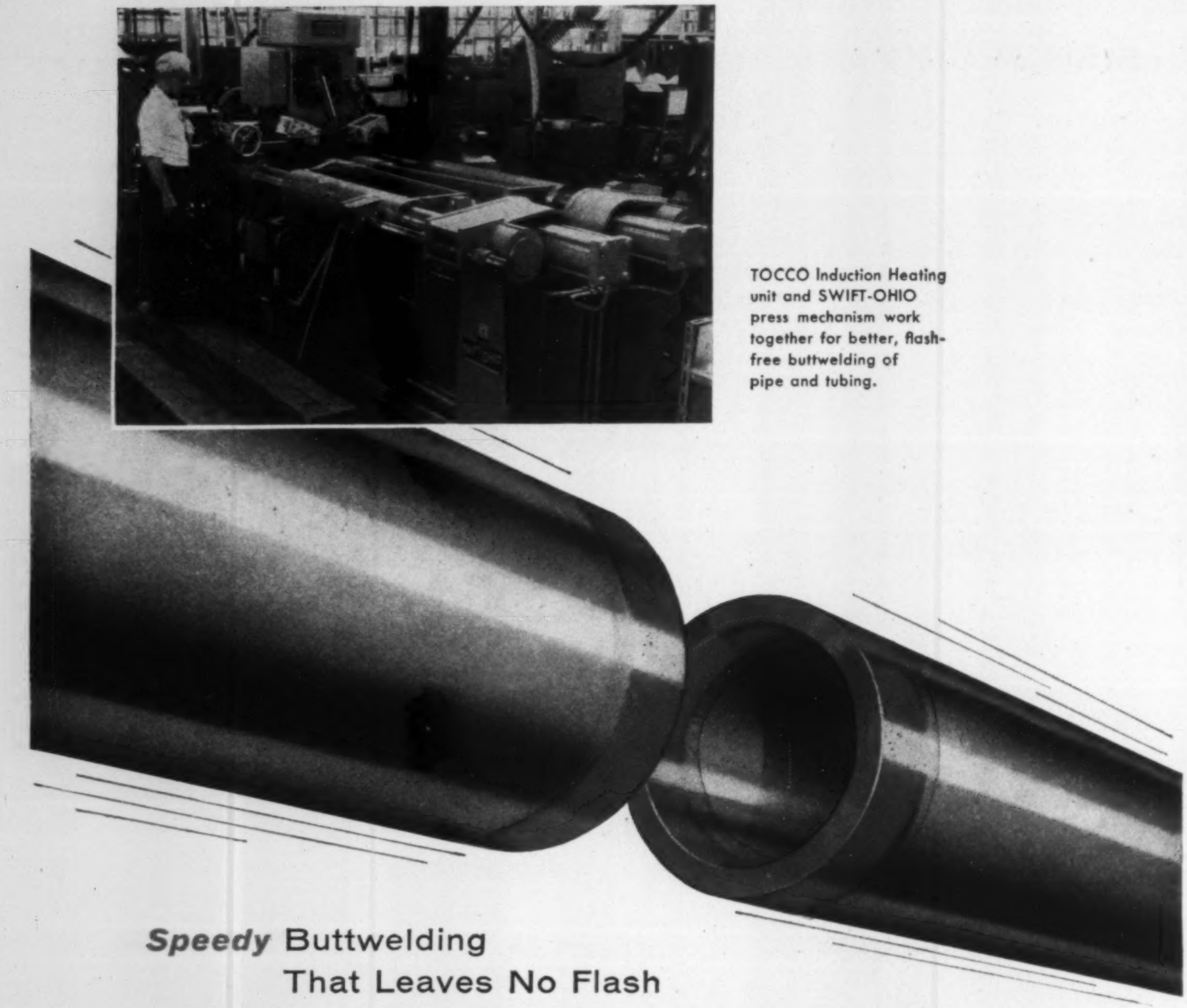


PROBLEM-SOLVING IDEAS are yours free in Data Unit No. 115. For your copy, ask any member of the Malleable Castings Council, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

MEMBER
MALLEABLE
CASTINGS COUNCIL



The versatility of Malleable castings is reflected in the variety of ferritic and pearlitic Malleable tractor parts, from the tough, dependable front axle bar to bolsters, lift arms, clamps, clevises, hitches, hinges, foot pedals, transmission planetary carriers and clutch parts.



TOCCO Induction Heating unit and SWIFT-OHIO press mechanism work together for better, flash-free buttwelding of pipe and tubing.

Speedy Buttwelding That Leaves No Flash

with TOCCO* Induction Heating

Now, in less than a minute you can get flash-free, smooth joints on any size pipe, regardless of its diameter or wall thickness.

Conventional buttwelding methods produce strong, sound joints but leave a brittle flash inside or outside the pipe. Inside flash can seriously impede fluid flow. Particularly on long lengths of pipe, removal of this inside flash is a real production headache—time consuming and expensive.

Whether *your* production bottleneck involves buttwelding, soldering, brazing, heat treating or forging, it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

TOCCO

JUST PUSH A BUTTON

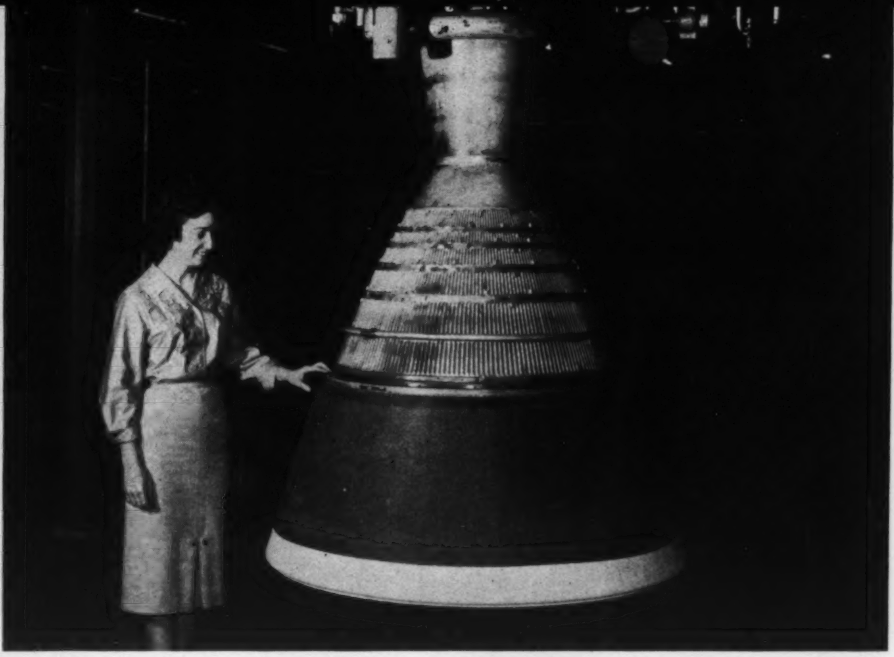
THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— **NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-7, Cleveland 5, Ohio

Please send reprint of article from STEEL Magazine entitled "Buttwelder Leaves No Flash".

Name______________________________
Position____________________________
Company___________________________
Address____________________________
City__________________Zone_____State________



Plastics reinforced with glass and silicates built up on a mandrel show . . .

How Aerojet Skirts a Rocket

• SUCCESSFUL development of an ablative skirt for second stage engines of the Air Force Titans is an important application for nonmetals in outsized rocket engines, says Aerojet-General Corp., Azusa, Calif., a subsidiary of General Tire & Rubber Co.

The firm is making both first and second stages of the Titan I and its big brother, Titan II, at its Sacramento, Calif., plant.

• The skirt allows a dry jacket start at high altitudes, greatly decreasing the danger of fire or explosion.

The skirt design has eliminated the hazard of propellent leaking into the combustion chamber before ignition. It also permits fuel and oxidizer to be held behind valves until ignition when regenerative cooling begins in the hollow tubes which form the top part of the thrust chamber. The ablative skirt on the bottom provides expansion for operation at high altitudes.

• Built-up layers of glass or asbestos reinforced plastic materials form the skirt.

Fabrication begins with the inner liner which is made of asbestos tape impregnated with phenolic resin, shingle wrapped on a mandrel. The tape surface is covered with hair felt and glass contour tape to let volatiles escape during curing. Finally, a vacuum bag is put over the layup. The vacuum bagged mandrel is cured in an autoclave maintained at 185 to 250 psi at temperatures up to 330° F.

After curing, the liner is machined and reinforced with impregnated glass cloth.

• Segmented flanges of 6061-T6 aluminum hold the skirt on the combustion chamber.

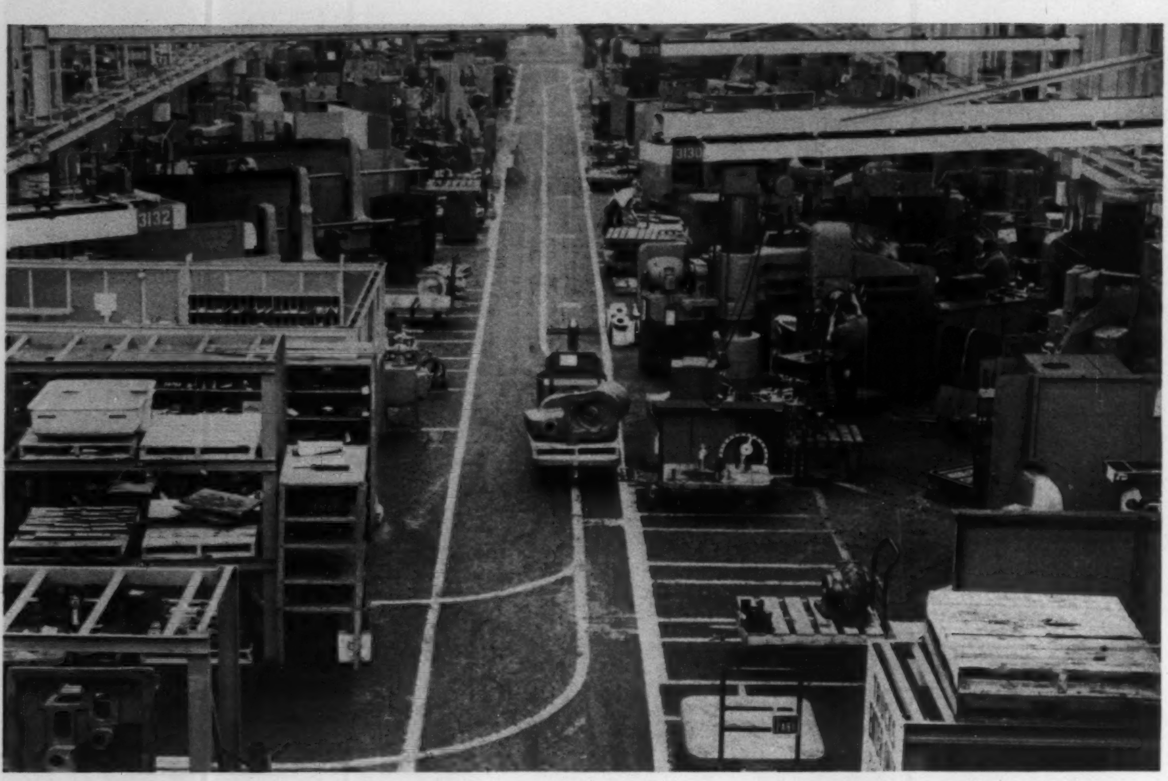
The segments are bonded to the forward edge of the liner with a liquid adhesive reinforced with asbestos phenolic tape and phenolic resin glass cloth which are cured for 1 hour at 320° F.

The outer reinforcement of the skirt is a cellular, glass fiber core. An adhesive is put on the liner surface, and precut segments of the cellular glass fiber are applied. After curing, the assembly is trimmed and shaped.

The aft edge of the core is filleted with an epoxy compound, wrapped with glass tooling tape, and cured.

The outer reinforcement is a phenolic resin and epoxy impregnated glass cloth. After application, final curing takes 2 hours at 220 to 280° F.

The thickness of the liner is governed by the damage from a full duration firing of the engine. Asbestos offers many advantages over other ablative materials, says Aerojet. Under the jet heat, the asbestos decomposes, giving off water at 1200 to 1400° F. At 1490° F, the crystalline structure changes, finally melting at 2800° F. Two crystalline changes plus the water vapor are cited as the reasons for the superiority of asbestos.



Wire in shop floor guides robot tractor-trailer . . .

Electronic Handling System Pays for Self in One Year

• AN ELECTRONIC material handling system paid for itself in one year at General Electric Co.'s Large Steam Turbine-Generator Dept. in Schenectady, N. Y.

In addition, estimated miscellaneous savings totaled about $90,000 says Frank E. Jaquinto, a member of the process development and facilities engineering group which was responsible for the plan.

• The system produced seven benefits in a machining and assembly operation:

- Manufacturing losses were reduced.
- Production per worker was increased.
- Manufacturing cycle time was reduced.
- In-process inventory was trimmed.
- Detailed methods of operation were developed.
- Product quality was improved.
- General housekeeping was bettered.

• All materials used by the machining and assembly section are stored in a marshaling area.

It's divided into individual storage cells, one for each work station on the production floor. All parts and raw materials not being machined are kept in the area. It also has space for defective or incomplete work returned from work stations.

• Linking the marshaling area with work stations is a robot tractor with up to three trailers controlled by a dispatcher-operator.

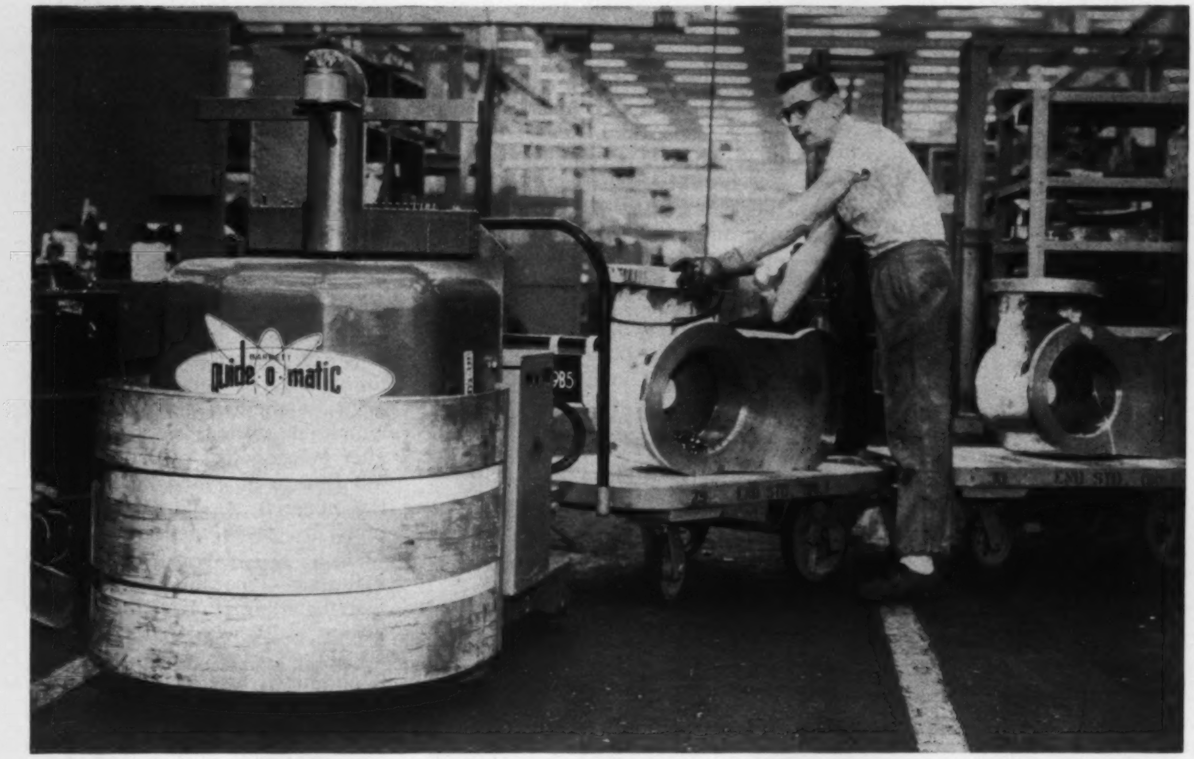
Stops are set on a work station selector mounted on the tractor. When the unit is activated, it will follow an established path along a current carrying guide wire embedded in the shop floor.

The unit will remain at selected station stops for a predetermined time before returning to the marshaling area.

A pocket slot on each trailer identifies it and holds paperwork which flows from the dispatcher to the operator at the selected work stop. A horn on the unit signals arrival.

• Intercom speakers at strategic points and two master Teletalk stations link operators with work directing centers.

For paging, the dispatcher pushes the all-call button. The setup



delivering parts to preselected stop

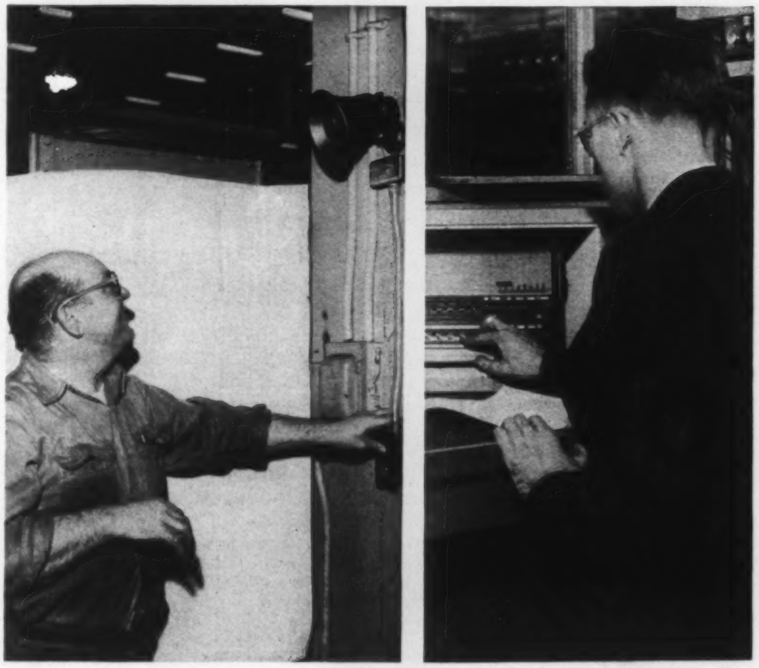
enables operators to remain within their work areas while carrying on necessary communications. It permits them to call for and return material to the marshaling area. Operators get faster action on problems that develop.

At each work station, racks are provided for stock parts and hardware. Quantities to be maintained on the floor are determined by annual usage rates. Maximum and minimum quantities with reorder points are established.

To maintain sufficient quantities of stock parts within the assembly area, a catalog was developed for the production clerk. It's kept up to date by IBM punch cards. Information provided includes a description of the part, assembly areas where used, part drawing number, order point and order quantity for stock bin reserve, and location within the work area by work station, rack, and accumulation tray.

Each work station is equipped with tools, bench, and equipment for work on specific components.

Operators, dispatcher always in touch



Liquid Sealant Holds Tight Against Vibration

THREE DROPS of a single component liquid (Loctite) lock the retention nuts on a hone and grind machine made by New Britain Machine Co., New Britain, Conn. It's also used to lock 32 screws holding eight clutch yoke retaining caps on the company's chucking machines and to retain fulcrum studs on bar machines.

New Britain's Gustave Carlson says three available strengths permit the engineering of torque requirements on screws, nuts, or bolts. Pot life is no problem. The material (made by American Sealants Co., Hartford, Conn.) hardens only when it's confined between closely fitting parts. Operating range: −65 to 300° F. Application methods include tumbling, a continuous feed tube, or hand applicator.

- **Shaft Bonding**—Several makers of motors for appliances and record players have virtually eliminated press fitting to bond shafts and rotors. Pushout forces averaging 800 lb were developed in one case when shafts were slip fitted and bonded with the sealant in a bonding area of 0.39 in. Special applications were developed to meet production rates of 10,000 motors per day at one factory.

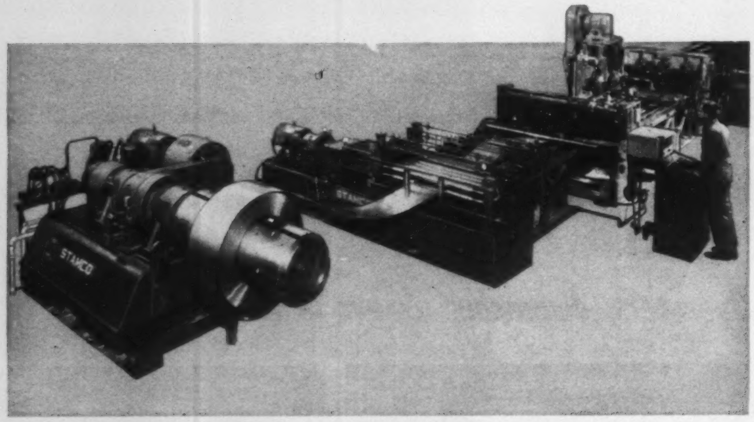
- **Bearing Retention**—A road machinery company replaced a 9 in. spherical roller bearing in the jaw of a rock crusher in 1 hour by slip fitting and retaining with the sealant. In another application, 4000 aluminum castings were reclaimed after being bored too large for an interference fit. Many users apply the material to add reliability to press fits, says American Sealants.

- **Sealing**—Pipe plugs used in systems handling JP-4 jet fuel at 800 psi are sealed with the material by an aircraft enginemaker.

Additional uses include press applications—locking stripper bolts, holddown bolts, adjusting nuts, and setscrews. In maintenance uses, applications include conveyor nuts, casters, and couplings.

The answer is **Stamco**

for equipment that reduces cost in slitting and shearing operations



The installation of Stamco equipment will help you realize savings in three important areas: inventory investments, time and labor, and reduced waste.

This new shear line is designed to accommodate stock up to 14 gauge, in widths to 48 inches, and in coils weighing a maximum of 20,000 pounds. Accuracy can be held to plus or minus 1/32 inch. It is set up to cut lengths from 14 inches to any maximum length.

Stamco, Inc.
New Bremen, Ohio, U.S.A.

Slitting and Coiling Lines • Cut-to-Length Lines • Flying Shear Lines • Power Squaring Shears • Continuous Process Lines Ferrous and Non-ferrous Mill Equipment

District Offices, Stamco Sales, Inc.
R. P. Popp, 18450 Livernois, Detroit 21, Michigan
R. P. Popp, 101 Investment Building, Pittsburgh 22, Pa.
I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

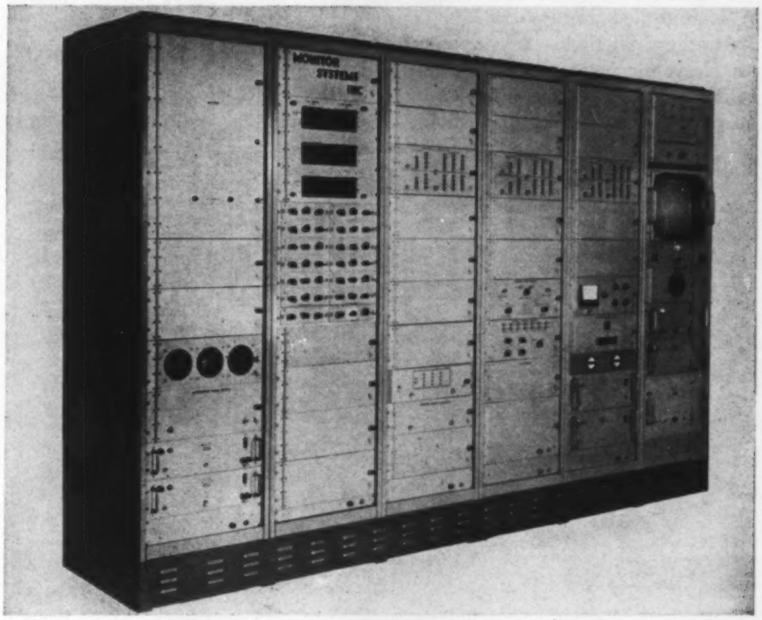
One Unit Handles All Digital Communications

DIGITAL information from a variety of sources (computers, teletypewriters, data transceivers, facsimile machines, and similar equipment) can be sent over telephone lines using a single rack of interchangeable plug-in units.

Up to 16 machines can simultaneously feed teletypewriter, tape, punch card, or other information into the equipment. It transmits simultaneously at 4800 bits (600 characters) per second over a single channel to the receiving point where similar equipment feeds it back to teletypewriter, tape, punch card, or other machines.

The manufacturer (ACF Electronics Div., Riverdale, Md., ACF Industries Inc.) says the equipment will permit users to establish communications systems with a minimum of equipment and still be able to expand the system by adding functional blocks that will not duplicate other blocks used in the system.

Data Recorder-Scanner Accurate to 0.01 Per Cent

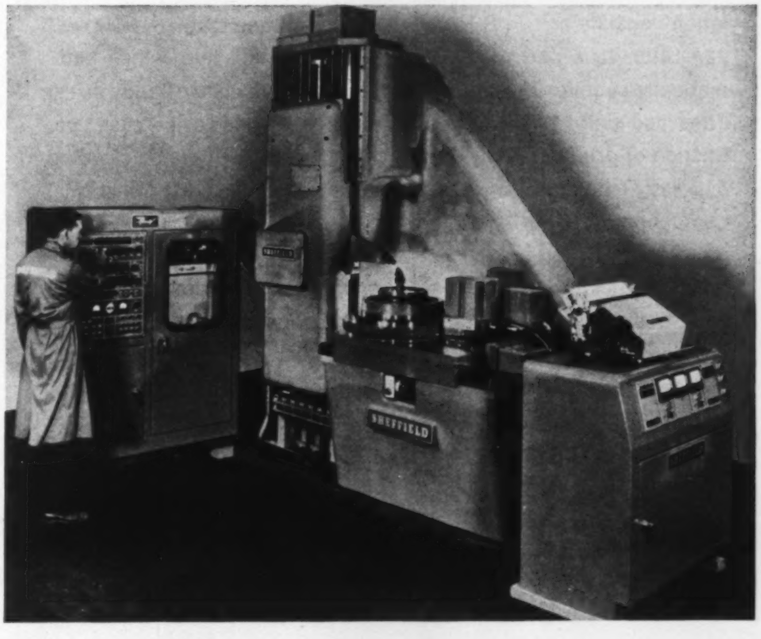


THE SERIES 7000 digital data recording and alarm scanning systems can be designed to meet the accuracy, speed, and reliability specifications of virtually any metalworking production or quality control application without overdesign, says the maker. Modular construction is used throughout.

The unit can be employed to scan any variable that is reducible to electrical form at speeds ranging from those of typewriter readout devices to magnetic tape recording units. Accuracies within 0.01 per cent are available. Electrical inputs from thermocouples, resistance temperature detectors, flow meters, or other transducers can be used.

For further information, *write* Dept. 23, Monitor Systems Inc., a subsidiary of Epsco Inc., Ft. Washington Industrial Park, Ft. Washington, Pa.

Tape Controlled System Measures Precision Parts



A UNIVERSAL, five axis, tape controlled measuring machine developed by Sheffield provides fast and highly accurate control of tolerances (inside, outside, and thickness) in parts manufacture. Readout is visual and printed.

In addition to speed, the system eliminates human error because it can automatically perform thousands of detailed measurements, says Louis Polk, Sheffield board chairman. For example, the device can take 100,000 precision readings per inch.

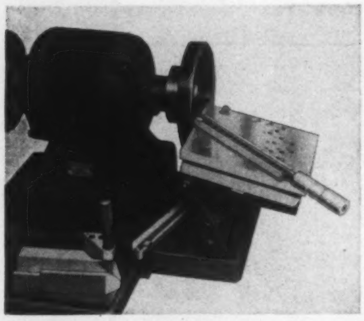
The unit can position and measure the positions of the electronic gaging styluses at any point or angle within 0.0001 in. in the gaging range of 20 in. in length and height. Accuracy in measuring wall thickness is within 0.000050 in. The company says that on a typical programed measurement sequence on a conical shaped part, 795 measurements (including 265 automatic, mathematical computations for wall thickness) can be done in about 62 minutes.

To maintain repetitive accuracy, the measurement system operates in a controlled atmosphere.

Another Sheffield development: An electronic inspection instrument (Stereopoint Gage) capable of measuring a hole 0.010 in. in diameter. That's half the size of holes previously measured on a production basis, says the company. Size, taper, and bellmouth are checked.

For further information, *write* Sheffield Corp., a subsidiary of Bendix Corp., Dayton 1, Ohio.

Gun Drill Nose Grinding Simpler with Fixture



GRINDING of gun drill noses can be simplified with the Eldorado rocker base, nose grinding fixture. It can be used on any simple bench or pedestal grinder with a diamond wheel.

The fixture has two parts—a rocker base that is set on the grinder's angle table and a block for holding the gun drill securely on the fixture. The rocker takes care of the traverse for grinding.

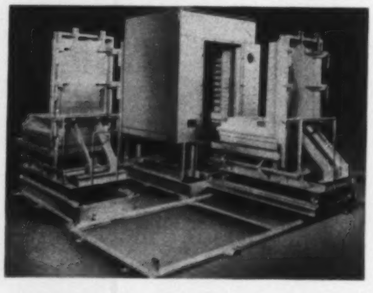
A micrometer block with micrometer stop accommodates drills from 0.2500 to 1 in. in diameter. Individual blocks (for specific sizes of gun drills) are available for sizes from 0.078 through 1 in. diameters.

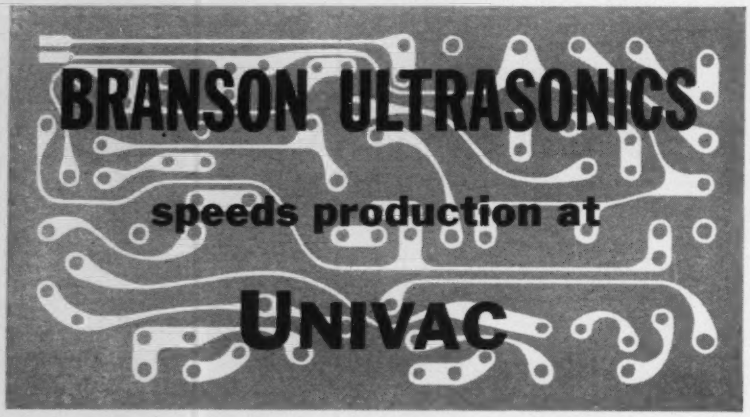
For further information, *write* Eldorado Tool & Mfg. Corp., 342 Boston Post Rd., Milford, Conn.

Car Bottom Kilns Work At 2750° F Atmosphere

TEMPERATURES up to 2750° F are the operating range of a modernized line of Harper car bottom kilns. The maker says they're adaptable to a broad range of firing and calcining applications in the processing of abrasives, carbon products, high quality ceramic ware, porcelain, and precision electronic ceramics such as ferrites, stearites, and titanites.

Air or controlled atmospheres can be used. Two power ranges are available in each size—a low power model for standard slow cycle firing





The problem: To remove flux from printed circuit boards, formerly done by hand brushing. This method was slow, expensive and not very efficient.

The solution: A "tailor-made" Branson/Univac system that cleans **completely, continuously,** and **automatically.** The ultrasonic installation consists of two 8 foot tanks, each powered by a 1000 watt generator. It is part of a continuous production line, which automatically supplies flux and solder, ultrasonically cleans and rinses, dries and unloads. This process enables Univac to increase production of printed circuit boards considerably. Ultrasonic cleaning assures complete cleanness at high production speed for critical components.

Whether your products are small or large, simple or complicated, you should investigate the use of ultrasonic equipment for your company. Branson's highly experienced, factory-trained specialists stand ready to assist you anywhere in the U. S. Tell us about your particular problem and Branson's engineering department will try to find the **best** possible solution in the **shortest** possible time.

SINCE 1946 — THE RESPECTED NAME IN ULTRASONICS
BRANSON INSTRUMENTS, INC.
Ultrasonic Power Division
36 Brown House Road, Stamford, Conn.

and a high power model for accelerated firing at high temperatures.

Temperature uniformity is obtained by providing adequate space around the charge for cross radiation and reflection. Dual car or multicar systems can be provided to speed production and save power. When controlled cooling is not required, dual kilns can be used with a single power and control package to reduce installation and equipment cost and effect savings in operating costs through a better use factor of kw demand.

For further information, *write* Harper Electric Furnace Corp., 110 Pearl St., Buffalo 2, N. Y.

Heat Treating Furnace Can Handle Many Jobs

SMALL production runs, tool and die heat treating, pilot operations, and metallurgical testing are applications for the Cooley, multipurpose, heat treating furnace. The manufacturer says temperature accuracy is maintained from 300 to 2000° F.

Features include a tight closing, vertical door which adjusts to any position, silicon carbide hearth plate, and coils which are permanently located in embedding material that resists oxidation and chemicals. Elements are readily available from stock and can be changed easily without dismantling the unit.

Bench and floor models are offered in two sizes with several control arrangements. The U-75 chamber measures 18 x 10 x 7 in.; the U-23 is 14 x 8 x 6 in.

For further information, *write* Cooley Electric Mfg. Corp., 38 S. Shelby St., Indianapolis 7, Ind.

Dual Head Way Unit Saves Room, Production Costs

A DUAL head, way unit saved room and cut product costs by replacing two stations and eliminating one transfer station on a 90 spindle transfer line. (It doubled up two individual lead screw tapping units on a single hydraulically actuated feed carriage.)

The dual head spindles are at an included angle of 46 degrees and are angled 23 degrees downward. The angular, lead screw, tapping units are independently driven. Hydraulic fast feed brings up the carriage bed on square ways. The opposed head spindles then advance alternately to tap the work.

An electric brake stops the taps instantly and the feed reverses automatically to back out the taps. The other head then runs through its cycle. Alternate operation avoids interference. Present tapping speed: 300 fpm (for aluminum). Speeds as low as 70 fpm (for cast iron, for example) can be obtained by replacing the driveshaft and intermediate gears.

For further information, *write* Foote-Burt Co., 13000 St. Clair Ave., Cleveland 8, Ohio.

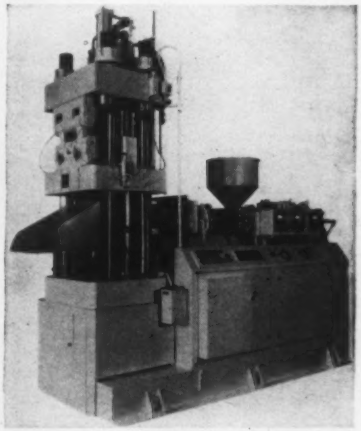
Injection Molding Press Has Screw Plasticator

A SCREW plasticator and a special drive mechanism design are incorporated in the Model 706, 12 ounce, automatic injection, molding press.

A single, straight shaft links the screw in the plasticizing cylinder with the piston in the ram cylinder which is located directly behind it, on the same axis. The piston and shaft rotate within the ram cylinder as the screw rotates in the plasticizing cylinder. The screw is driven by a hydraulic motor mounted directly above the shaft, to the rear of the plasticizing cylinder, through a stationary, right angle gearbox.

The driving gear engages the screwshaft by means of gibs and splines, which permit the shaft to move axially forward and back through the gearbox as the screw advances or retracts within the plasticizing cylinder. The hydraulic motor provides infinitely variable speed control and protection against torque overload.

A thoroughly plasticized and completely homogenized material is produced with less electrical power (a substantial amount of mechanically produced heat is used). The press is suitable for use with vinyl and other heat sensitive plastics. The company also says the screw plasticized material can be injected at low pressures to produce strainfree molded products.



For further information, *write* F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Technique Lowers Cost of Brazing Honeycomb

A PROCESS for brazing and soldering honeycomb sections that uses a noncorrosive flux eliminates the need for atmospheres, vacuum, long heating, and cooling cycles, says the maker. A wide range of lengths, shapes, and sizes can be handled. The process is rapid, can be made continuous.

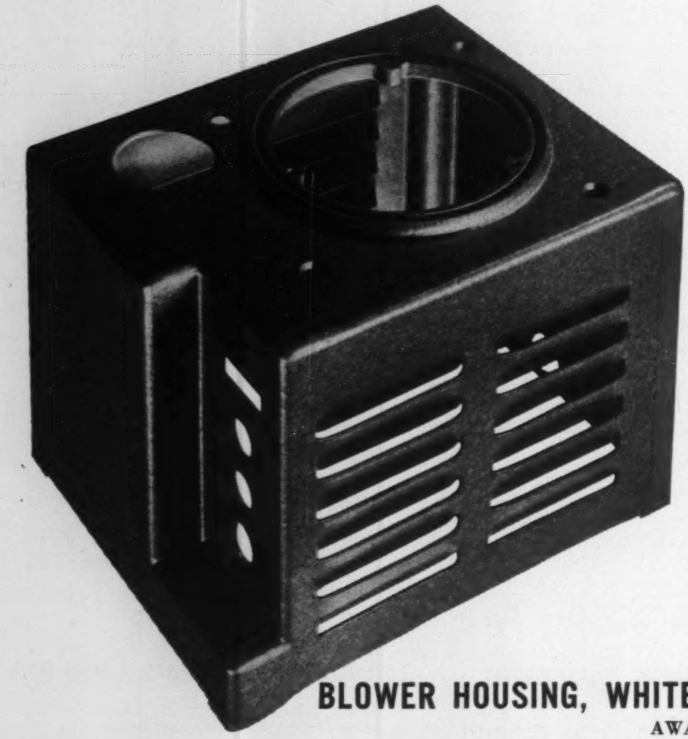
For further information, *write* Murray Hill Research, P. O. Box 73, Murray Hill, N. J.

are you getting your METAL'S WORTH?

COST SAVING: 60%

That's how much Jamieson Laboratories estimate they save by die casting this blower housing from Zamak instead of stamping from steel. Only with a zinc die casting can they get the rugged ***thin-wall*** construction they need—***tough enough*** to take the shocks and vibration encountered in use, yet with thin-wall sections ***ductile enough*** to take extensive blanking and forming operations after casting. Neither competitive die casting material—aluminum or magnesium—nor the leading injection molded plastics, can meet these demands.

"The design is highly functional and extremely low cost compared to other methods of manufacture," says Jamieson. Can you say that of your own choice of fabrication? Are you getting your metal's worth? Remember—Zamak gives you more for less.



BLOWER HOUSING, WHITECAP AIR-CONDITIONED HELMET

AWARD OF MERIT

The New Jersey Zinc Company's "Zinc Die Casting of The Year" contest

Die Cast by Westland Die Casting Company

HORSE HEAD® SPECIAL ZINC AND HORSE HEAD ZAMAK ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

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DEVELOPERS OF THE ONLY STANDARD ZINC DIE CASTING ALLOYS IN USE TODAY

HORSE HEAD PRODUCTS

NEW Literature

Write directly to the company for a copy

Welding of Rocket Engines

High production, closely controlled machine welding of rocket engines with storable propellent systems at Reaction Motors Div., Thiokol Chemical Corp., is discussed in a reprint. Specify Form ADR 133. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

X-ray Handbook

A 25-page handbook about industrial x-ray films has a section with information about processing, charts showing film sizes converted to square footages, and a table of common logarithms. Ask for Industrial X-Ray Film Book No. 210.991. Gevaert Co. of America Inc., 321 W. 54th St., New York 19, N. Y.

Beryllium Copper Strip

Brush 190, a mill heat treated, beryllium copper strip is described in a data sheet. It gives mechanical properties for each of six tempers available and recommended minimum radiuses for 90 degree bends. Thermal stress relief, forming, and joining procedures are described, with instructions for pickling and plating. Brush Beryllium Co., 5209 Euclid Ave., Cleveland 3, Ohio.

Plastic Glazing

Bulletin No. 200-61 includes a discussion of combinations of plastics and other materials for meeting future requirements for transparent glazing. Swedlow Inc., 6986 Bandini Blvd., Los Angeles 22, Calif.

Sprayed Metal Overlays

Selection of metal powders for sprayed overlays is covered in Technical Data Sheet No. T-3. Both standard metallizing and the Sprayweld process are discussed. Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich.

Heat Treating

A discussion of the pros and cons of incorporating quenching facilities in automatic production lines is included in *Heat Treat Review*, Vol. 12, No. 2. Also included is a case history on facilities for heat treating roller bearings ranging in size from less than a pound to several tons each. Surface Combustion Div., Midland-Ross Corp., Toledo 1, Ohio.

Electrical Insulation

"Silicones for Electrical Insulation" has more than 20 photographs and charts that provide data and examples of silicones in use in a wide variety of electrical and electronic applications. Included are sections on silicone varnishes for impregnating and protective coatings, clear and opaque potting and encap-

geared for success

Designing is a frustrating job. You carefully draw up a blue-ribbon assembly that is a model of efficiency, only to have Manufacturing say it will cost too much. These prize-winning gears could have met that same fate, but they were designed for powder metallurgy.

Compacted from brass powder, they combine the functions of gears and cams in precise contours economically impractical by traditional means of gear cutting. They contribute to **reduced** overall production costs while providing the strength, corrosion resistance, exact part to part duplication and absolute reliability necessary as the working mechanism of the S. H. Couch Co. fire alarm pull box.

Fabricated by American Sinterings Division of Engineered Plastics, Inc., they are the Grand Prize winners in the "Nonferrous Metal Powder Part of The Year" competition sponsored by New Jersey Zinc.

Avoid going back to the drawing board—design for nonferrous powder metallurgy. Write for your copy of "Designing For Pressed Brass and Nickel Silver Parts."

HORSE HEAD® ATOMIZED NONFERROUS METAL POWDERS ARE PRODUCED BY
THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 38, N. Y.
DEVELOPERS OF BRASS & NICKEL SILVER POWDERS SETTING TODAY'S STANDARDS

HORSE HEAD PRODUCTS

sulating materials, pressure sensitive adhesives, dielectric fluids, dielectric greases, wire and cable insulation, and combination constructions of silicones with other materials. Specify Publication CDS-288. Silicone Products Dept., General Electric Co., Waterford, N. Y.

Motor Rotor Postheating

A technical paper discusses the reasons for postheating diecast aluminum rotors for electric motors. Equipment and automatic processing are also discussed. Selas Corp. of America, Dresher, Pa.

Crane Specification Tablet

A tablet contains five duplicate sets of crane specification data and forms designed to aid in establishing crane specifications for a given application. It gives data on classes of service, speed classifications for bridge, trolley, and hoist, and information on girders, trucks, electrical systems, brakes, cabs, and other components involved in an overhead electric crane specification. The tablet applies to cranes of any make. Conco Engineering Works Inc., Mendota, Ill.

Circuit Breakers

Costs, sizes, installation, and other features of circuit breakers and safety switches are discussed in a pocket sized guide. Standard Control Div., Westinghouse Electric Corp., Beaver, Pa.

Equipment Leasing Brochure

"The Engineered Equipment Lease" covers leasing of new and used equipment. Subjects include: Conservation of capital and credit; tax-timing benefits; balance sheet effect; cash flow improvement; recovery of capital through sale and lease back; and other exclusive advantages. United States Leasing Corp., 580 California St., San Francisco 4, Calif.

Tin Plate Testing

Quality test methods for thickness and continuity of tin coating and the determination of oxide and oil films are discussed and compared. Also covered are performance tests for rust resistance, staining, lacquerability, solderability, and corrosion. Tin Research Institute Inc., 492 W. Sixth Ave., Columbus, Ohio.

Rare Earth Elements

An eight page brochure (a revised 1961 edition) contains technical information about thorium, yttrium chemicals, metals, and alloys of the rare earth group of elements. Vitro Chemical Co., a division of Vitro Corp. of America, 342 Madison Ave., New York 17, N. Y.

Crane Specifications

Basic crane information and specifications are contained in *E. O. C. I. Specification No.* 61, a 28 page booklet. It consists of six sections covering general specifications, structural design, mechanical design, electrical equipment, a glossary, and appendixes with service classifications, suggested operating speeds, wheel load tables, and typical inquiry data sheets (inquiries will be referred to members handling distribution). Electric Overhead Crane Institute Inc., 1 Thomas Circle, Washington 5, D. C.

Using Manufactured Abrasives

A special report on pressure blasting with manufactured abrasives describes the areas of application for pressure blasting and the various media used. Emphasis is on the proper selection and use of aluminum oxide and silicon carbide abrasive. Advertising Dept., Norton Co., Worcester 6, Mass.

Cobalt-Base Alloy

A research report, "Properties of the New Cobalt-Base Alloy UMCo 50," contains data on structure, room temperature tensile strength and 100 hour stress rupture strength at 1600 and 1800° F, and the effect of additions on Co-Cr-Fe alloys. Applications of the alloy are discussed in two previous papers, "Application of a New Cobalt-Base Alloy in Metallurgical Furnaces" and "Manufacture and Applications of a Cobalt-Base Alloy." Cobalt Information Center, Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

Silver Brazing Alloys

Procedures for torch brazing with Silvaloy low temperature silver brazing alloys are detailed in a data file. The literature describes six steps for strong, leakproof joints: Joint design, preparation, fluxing and assembling, heating and making the braze, cooling the work and flux removal, and inspection. Technical Service Dept., Engelhard Industries Inc., 75 Austin St., Newark 2, N. J.

Steel Engineering

Four papers which discuss continuing advances in strength levels, product forms, and design applications of constructional steels are printed in a 59 page brochure, *New Concepts in Steel Design and Engineering*. Market Development Div., U. S. Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

Ablation Resistant Plastic

A reinforced, lightweight plastic which combines ablation resistance with thermal insulation and heat resistance is described in a technical bulletin. Taylor Fibre Co., Norristown, Pa.

Noise Control Data

A 43 page study employs comparison charts and graphs in a detailed discussion of current theories of sound transmission in different types of walls. Dept. A45, E. F. Hauserman Co., 5711 Grant Ave., Cleveland 5, Ohio.

Wall Chart

A 17 x 22 in. wall chart is laid out to facilitate scheduling of equipment shutdowns for maintenance. Items involved in the shutdown are shown and space provided for listing time and manpower requirements. Specify Wall Chart SM-5732. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Optimism High Despite Slump

DESPITE some falling off in demand and price weaknesses in a few products, steelmakers are optimistic about the near term outlook.

They're confident that sales and shipments will decline only slightly in July and that orders will start climbing again next month. They view the dip as a brief interruption—not a reversal—of the trend toward higher operations that has been underway since the start of the year.

Demand is tapering off because: 1. Automakers have enough steel on hand or in transit to wind up production of their 1961 models. 2. Other users received enough metal in May and June to bring their inventories up to desired levels. 3. Many metalworking plants are shutting down for vacations. 4. Some industries have passed their seasonal peaks in consumption.

OPERATIONS SLIDE—In the wake of the slump, steelmakers are gradually curtailing production. Ingot output in the week ending July 8 will decline for the sixth consecutive time—partly because of the July 4th holiday.

STEEL estimates that the industry poured 1,970,000 ingot tons in the week ended July 1. Production was equivalent to 69 per cent of 1960 capacity. Operations have dropped only 4 points in the last five weeks. They reached a peak of 73 per cent in the week ended May 27, after climbing steadily from a recession low of 38.7 per cent of 1960 capacity.

OUTLOOK BRIGHTENS— Operations probably won't improve materially until plant vacations end and automakers start assembling next year's models; but market analysts are increasingly confident of an early upturn. Latest reports show:

- Construction contracts awarded in May were 5 per cent above those in May, 1960. The biggest gains were in heavy engineering and residential building. Total awards for the first five months of 1961 were $14.6 billion (vs. $14.1 billion in the like period of 1960), says F. W. Dodge Corp.
- Fabricated structural steel bookings in May surged to a 17 month high, reports the American Institute of Steel Construction. The industry contracted 391,703 tons of structural steel for building and bridge construction, 30 per cent more business than it booked in May, 1960.
- Machine tool orders in May climbed to $50.3 million, up from $47.6 million in April this year and $49.9 million in May of last year, says the National Machine Tool Builders' Association. Inquiries are trending upward, suggesting better business in the second half.

PRICES GO UNDERGROUND—Tough competition in the world market forced U. S. Steel Export Co. to withdraw its published prices on semifinished products for export—blooms, billets, and slabs. Hereafter, prices will be quoted only on request, and salesmen will apparently be free to meet below-list competition. Published prices of reinforcing bars sold in the U. S. were recently withdrawn by some producers because they also had become meaningless.

TIN PRICE WATCHED—Although they're concerned about the rising price of tin—it has jumped about 10 cents a pound in the last two weeks—steelmakers say they don't believe shortages of the metal will curtail their production of tin plate. One of the largest mills reportedly has a stockpile big enough to last through 1961 and part of 1962. Unless the price of tin goes out of sight, steelmakers aren't likely to raise tin plate prices before Oct. 1 (when industry employment costs go up around 10 to 12 cents an hour).

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STEEL
QUARTERLY SURVEY

COMPONENTS	CURRENT INVENTORIES					3rd Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
CASTINGS . . . . Die, gray iron, malleable, nonferrous, steel.	2%	22%	61%	11%	4%	16%	71%	13%
OTHER FORMED COMPONENTS . . . . Forgings, stampings, springs, wire shapes.	2%	12%	53%	23%	10%	14%	69%	17%
MACHINED COMPONENTS . . . . . . Bearings, couplings, cylinders, gears, screw machine products.	2%	23%	41%	23%	11%	15%	75%	10%
ELECTRICAL EQUIPMENT, MOTORS . .	10%	22%	43%	20%	5%	22%	76%	2%
FASTENERS	—	26%	42%	24%	8%	15%	77%	8%
MECHANICAL RUBBER GOODS, BELTING	6%	34%	38%	16%	6%	13%	80%	7%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Stocks of Parts Show Little Change

And there won't be much of a shift in the third quarter. Despite the business upturn, buyers are generally pleased with over-all inventory position

COMPONENT BUYERS will not be rushing to build their inventories during the recovery—which confirms the belief a number of economists have held right along: Business indicators are up, but there won't be a boom.

Purchasing agents responding to STEEL's quarterly survey noted little change in the over-all inventory picture during the last three months: 13 per cent said stocks slipped in the quarter; 10 per cent reported an increase; 77 per cent recorded no change. And the number of buyers pleased with the pace is at a several-year high. A hefty 74 per cent plan to have reserves at present levels three months from now. Only 10 per cent will add to their inventories; 16 per cent will cut.

• How They Stand—Reserves are in good balance: 25 per cent are under 30 days; 49 per cent are in the 30 to 60 day category; 26 per cent are in the over 60 day group. While the over-all position showed no more than a 2 percentage point fluctuation in any one level, there were more significant changes within the product groupings. However, there was no consistent pattern.

Inventories of castings were shortened a little, shifting from the over 60 day to the 30 to 60 day period. There was a slight buildup in other formed components and fasteners. Electrical equipment showed a shift from over three months to 60 to 90 days. Rubber goods revealed a sharp uptrend in the 10 to 30 day period, a drop in the 30 to 60 day level, and an increase in the three month and over category. There was little change in machined component inventories.

• Business Is Good—The desire for the status quo doesn't mean business is poor. On the contrary, complaints about deliveries, a fairly good indicator of the business pace, rose to 28 per cent of STEEL's respondents, the highest number since April, 1960. Deliveries of steel castings, bearings, and forgings were noted, but electrical goods were by far the most troublesome.

Although overstock problems were 3 percentage points above where they were in the last survey (see STEEL, Apr. 3, p. 115), they were otherwise at the lowest level since January, 1960.

As suggested previously by STEEL,

purchasing agents appear to be revising buying practices to keep inventories at minimum working levels. More firms are insisting upon the tactic to free funds for investment in other areas. It could be working well. More than 72 per cent of STEEL's respondents said stocks are where they expected them to be at this time. An equal number (only 14 per cent each) said they were higher or lower.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 83 & 84

Seasonal influences are slowing down demand for sheets and strip. Volume still is heavier than that in the other major steel products, and producers are anticipating an upturn in requirements following the vacation shutdowns at metalworking plants. Automotive needs are also expected to spurt in August.

Except for galvanized sheets, on which deliveries range seven to ten weeks, shipments are considered prompt. Hot rolled tonnage can be had in two to three weeks, cold rolled in two to five weeks. Such a delivery situation is not conducive to inventory building by consumers.

Steel Bars . . .

Bar Prices, Page 82

Hot rolled bar producers shipped about the same tonnage in June as they did in May, which was the best month this year. Orders have tapered off the last few days, and deliveries continue to range two to four weeks. Cold drawn bars are still available from stock.

July bar production and shipments will probably be off 10 to 15 per cent. Reasons: 1. Automakers have enough steel to wind up their 1961 model schedules. 2. Other users hold adequate inventories. 3. Consumption will be off seasonally, with many consuming plants closed for vacations.

Tin Plate . . .

Tin Plate Prices, Page 84

The seasonal peak in tin plate demand has passed, but sales are holding up well. Operations in the second quarter were close to capacity, and June shipments were almost as large as May's. Production will probably drop 15 to 20 per cent in July, but shipments won't decline that much. Reason: Canmakers have smaller than usual inventories and are depending on steady shipments from mills.

Despite concern over the rising price of tin, steelmakers don't fear any shortages. One large tin plate producer has enough tin in inventory to last through 1961 and part of 1962.

The recent 10-cent-a-pound jump in tin upped the cost of making 0.0088 gage tin plate ($\frac{1}{4}$ lb tin coating per base bax) by about 63 cents per ton, one Pittsburgh area mill figures. Others estimate the 10 cent advance will raise tin plate production costs as much as $1.10 a ton.

Wire . . .

Wire Prices, Pages 84 & 85

Producers of merchant wire are still encountering sharp competition from importers although they are promising spot delivery on virtually all items. Manufacturers' wire is available within a week to five weeks, depending on the nature of requirements. Demand for manufacturers' grades is down a little, largely because of a slowdown in auto needs. By the end of July, it's expected automotive buying for the 1962 models will be getting underway.

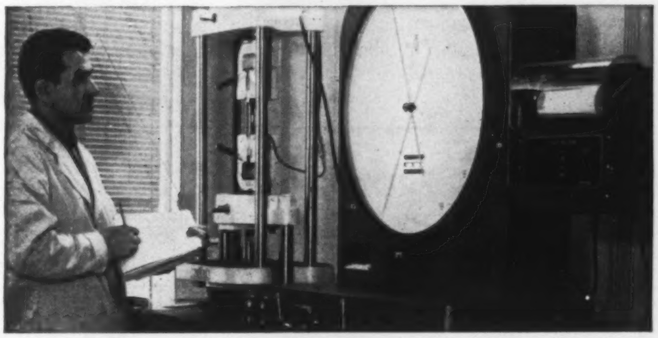
Distributors . . .

Prices, Page 87

Steel service center operators expect a drop in metalworking business this month due to vacation shutdowns. Maintenance and repair work, however, will offset the slump in metalworking demand to some extent. The market continues weak. Starting with concrete bars, price shading has spread to stainless steel and standard carbon steel products and specialties at some points.

Size and quantity extras have been increased $2 to $6 a ton on imported steel products in the Houston area. The quantity extra is in effect on orders under 2 tons.

Quality Control "Lab" Insures Quality Products!



To continue with Ulbrich's policy of constantly giving customers more and better service Ulbrich has installed a fully equipped laboratory. After conversion of steel stocks to customer requirements, physical properties are checked on such equipment as a Tinius Olsen Tensile Machine, pictured above. Bend Test equipment, Rockwell Testers, a Kentron Micro-Hardness Tester and a complete chemical department supply time saving, accurate analysis and Quality Stainless Steel to exact customer specifications.

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Semifinished Steel . . .

Semifinished Prices, Page 82

Although U. S. Steel Corp. has withdrawn its published prices on semifinished steel for export—particularly blooms, billets, and slabs—other producers have not announced similar action. The move by U. S. Steel is said to reflect sharp competition with foreign and U. S. steelmakers in the world markets.

April exports of ingots, blooms, billets, slabs, and sheet bars at 2472 net tons valued at $544,283 were up sharply from the 917 tons valued at $221,041 moved out of the country in April, 1960. However, exports in the first four months this year were down slightly from a year ago, totaling 8434 tons valued at $1,609,184 vs. 14,365 tons valued at $1,697,407 in the 1960 period.

A large inquiry for billets to be shipped to the Orient is expected to be placed soon.

Steel Ingot Output Dips

STEELMAKING operations will dip sharply in the week ending July 8 because of the observance of the Independence Day holiday—it will also mark the sixth consecutive weekly decline. STEEL estimates production for the week ended July 1 at 1,970,000 tons, a drop of 0.4 per cent from the previous week. By comparison, 2,077,000 tons were poured in the week ended May 27, the high for the year.

- **Buffalo** — Major steel plants in this district have curtailed production. Bethlehem Steel is operating 13 of 35 open hearths; Republic Steel, four of nine; and Wickwire Spencer Steel Div., one of three. The district rate is down to about 44 per cent of 1960 capacity vs. about 75.5 per cent a month ago.
- **Chicago** — Ingot output held at about 76 per cent of 1960 capacity for the week ended July 1. Some slackening will occur over the July 4 holiday, but most mills will maintain blast furnace and steelmaking furnace operations close to the present rate. One exception is Keystone Steel & Wire Co., which closed for vacation from June 26 until July 4.
- **Philadelphia**—Following a slight pickup in the week ended June 24, steel production in the Northeast district slipped slightly in the week ended July 1. A more pronounced decline is forecast for the Independence Day holiday week (ending July 8). Vacation schedules of steel producers in the area include: John A. Roebling's Sons Div., Colorado Fuel & Iron Corp., June 27-July 17; Carpenter Steel Co., July 1-July 17; Harrisburg Steel Co., late June to July 10; and Midvale-Heppenstall Co., July 10-July 31.
- **Birmingham** — The steelmaking rate in this district is estimated at 79 per cent of 1960 capacity, a gain of 1 point over the previous week's rate.
- **Youngstown**—Steel mills operated at an estimated 51 per cent of 1960 capacity during the week ended July 1, a gain of 1 point over the preceding week. The increase reflects completion of repairs at one major plant in the district. A downtrend is predicted for July because many consuming plants will be closed for vacations, and automobile manufacturers will be winding up assembly of 1961 models.
- **Cincinnati**—A cutback of almost 5000 tons in output of steel ingots at one of the large mills in the area cut the district's index of production. It fell to 110 (based on 1957-59 weekly average) in the week ended July 1 from 118 the preceding week.
- **Cleveland**—Steel ingot production holds steady. During the last two months, the tonnage has ranged from a low of 111,114 tons (week ended June 17) to a high of 116,670 tons (week ended June 10).

STEEL INGOT PRODUCTION

Weeks Ended	Net Tons	Change
July 1	1,970,000*	— 0.4%
June 24	1,978,000	— 0.4%
June 17	1,985,000	— 2.8%
Totals to June 24		
1961	43,146,000	—26.7%
1960	58,876,000	

DISTRICTS	Week Ended —June 24— Tons‡	Week Ended —June 24— Index†	Week Ended June 17 Index†
Northeastern	269,868	101	98
Buffalo	81,778	84	100
Pittsburgh	375,301	93	92
Youngstown	151,283	89	94
Cleveland	113,892	123	120
Detroit	140,589	134	137
Chicago	426,447	114	112
Cincinnati	88,978	118	113
St. Louis	63,060	120	118
Southern	126,823	117	119
Western	142,634	122	119
Industry	1,978,000	106.2	106.6

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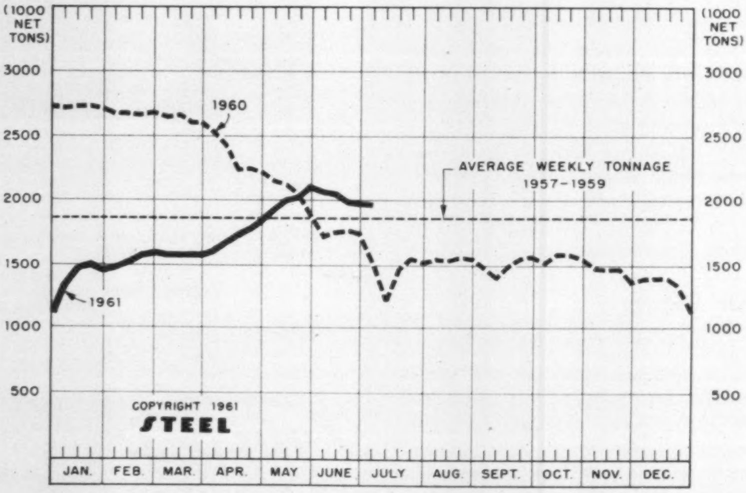
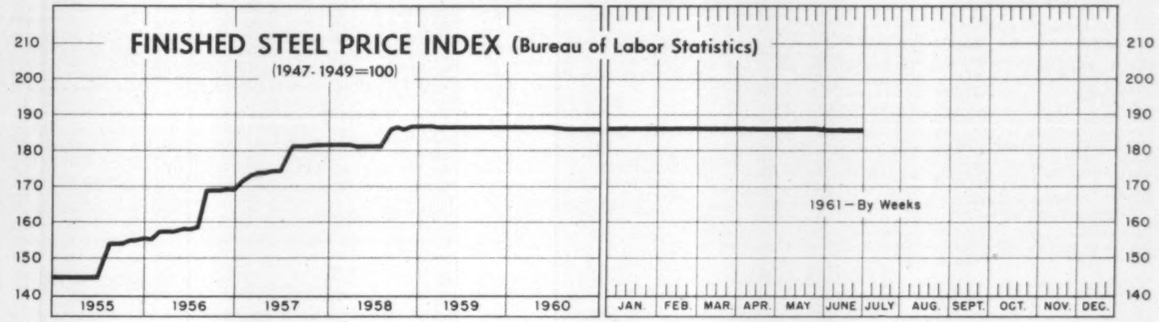
*Estimated by STEEL.

†1957-59 (1,862,933 tons) = 100.

‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites


FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

(1947-1949=100)

June 27, 1961	Week Ago	Month Ago	May Index	Year Ago
185.4	**185.5**	**185.6**	**186.1**	**186.6**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 27

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1 ...	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.150
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	193.032
Casing, Oil Well, Alloy (100 ft)	302.603
Tubes, Boiler (100 ft) ...	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common.	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	June 28 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)..	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.98
No. 2 Fdry, Pig Iron, GT .	66.49	66.49	66.49	66.49	60.27
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT ...	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	37.00	37.83	37.33	31.33	46.00

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 28 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh ...	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia .	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh ...	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh ...	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh ...	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts. ...	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	June 28 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia ..	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila. ..	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham ..	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net ton† ..	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$36.50	$36.50	$35.50	$30.50	$44.50
No. 1 Heavy Melt, E. Pa. .	39.00	39.50	39.00	34.00	47.50
No. 1 Heavy Melt, Chicago .	35.50	37.50	35.50	29.50	46.00
No. 1 Heavy Melt, Valley ..	38.50	38.50	38.50	32.50	44.50
No. 1 Heavy Melt, Cleve. ..	35.50	35.50	35.50	31.50	42.50
No. 1 Heavy Melt, Buffalo .	31.50	31.50	31.50	30.50	42.50
Rails, Rerolling, Chicago ...	58.50	58.50	57.50	49.50	66.50
No. 1 Cast, Chicago	41.50	42.50	42.50	40.50	45.50

COKE, Net Ton

Beehive, Furn., Connlsvl. ..	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl. ..	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee ...	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, June 28, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 83; footnotes, page 85.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5	$76.00

INGOT, Alloy (NT)

Detroit S41	$82.00
Economy,Pa. B14	82.00
Farrell,Pa. S3	82.00
Lowellville,O. S3	82.00
Midland,Pa. C18	82.00
Munhall,Pa. U5	82.00
Sharon,Pa. S3	82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4	$82.00
Bessemer,Pa. U5	80.00
Buffalo R2	80.00
Clairton,Pa. U5	80.00
Ensley,Ala. T2	80.00
Fairfield,Ala. T2	80.00
Fontana,Calif. K1	90.50
Gary,Ind. U5	80.00
Johnstown,Pa. B2	80.00
Lackawanna,N.Y. B2	80.00
Munhall,Pa. U5	80.00
Owensboro,Ky. G8	80.00
S.Chicago,Ill. R2, U5	80.00
S.Duquesne,Pa. U5	80.00
Sterling,Ill. N15	80.00
Youngstown R2	80.00

Carbon, Forging (NT)

Bessemer,Pa. U5	$99.50
Buffalo R2	99.50
Canton,O. R2	102.00
Clairton,Pa. U5	99.50
Conshohocken,Pa. A3	99.50
Ensley,Ala. T2	99.50
Fairfield,Ala. T2	99.50
Farrell,Pa. S3	99.50
Fontana,Calif. K1	109.00
Gary,Ind. U5	99.50
Geneva,Utah C11	99.50
Houston S5	104.50
Johnstown,Pa. B2	99.50
Lackawanna,N.Y. B2	99.50
LosAngeles B3	109.00
Midland,Pa. C18	99.50
Munhall,Pa. U5	99.50
Owensboro,Ky. C8	99.50
Seattle B3	109.00
Sharon,Pa. S3	99.50
S.Chicago R2, U5, W14	99.50
S.Duquesne,Pa. U5	99.50
S.SanFrancisco B3	109.00
Warren,O. C17	99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2	$119.00
Bridgeport,Conn. C32	119.00
Buffalo R2	119.00
Canton,O. R2, T7	119.00
Conshohocken,Pa. A3	121.00
Detroit S41	119.00
Economy,Pa. B14	119.00
Farrell,Pa. S3	119.00
Fontana,Calif. K1	140.00
Gary,Ind. U5	119.00
Houston S5	124.00
Ind.Harbor,Ind. Y1	119.00
Johnstown,Pa B2	119.00
Lackawanna,N.Y. B2	119.00
LosAngeles B3	139.00
Lowellville,O. S3	119.00
Massillon,O. R2	119.00
Midland,Pa. C18	119.00
Munhall,Pa. U5	119.00
Owensboro,Ky. G8	119.00
Seattle(6) B3	140.00
Sharon,Pa. S3	119.00
S.Chicago R2,U5,W14	119.00
S.Duquesne,Pa. U5	119.00
Struthers,O. Y1	119.00
Warren,O. C17	119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$122.50
Canton,O. R2	125.00
Cleveland R2	122.50
Gary,Ind. U5	122.50
S.Chicago,Ill. R2,W14	122.50
S.Duquesne,Pa. U5	122.50
Warren,O. C17	122.50

SKELP

Aliquippa,Pa. J5	5.05
Benwood,W.Va. W10	5.05
Ind.Harbor,Ind. Y1	5.05
Munhall,Pa. U5	5.05
Pittsburgh J5	5.05
Warren,O. R2	5.05
Youngstown R2, U5	5.05

WIRE RODS

AlabamaCity,Ala. R2	6.40
Aliquippa,Pa. J5	6.40
Alton,Ill. L1	6.60
Bartonville,Ill. K4	6.50
Buffalo W12	6.40
Cleveland A7	6.40
Donora,Pa. A7	6.40
Fairfield,Ala. T2	6.40
Houston S5	6.65
IndianaHarbor,Ind. Y1	6.40
Johnstown,Pa. B2	6.40
Joliet,Ill. A7	6.40
KansasCity,Mo. S5	6.65
Kokomo,Ind. C16	6.50
LosAngeles B3	7.20
Minnequa,Colo. C10	6.65
Monessen,Pa. P7	6.40
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.40
Roebling,N.J. R5	6.50
S.Chicago,Ill. R2, W14	6.40
SparrowsPoint,Md. B2	6.50
Sterling,Ill.(1) N15	6.40
Sterling,Ill. N15	6.50
Struthers,O. Y1	6.40
Worcester,Mass. A7	6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2	5.50
Aliquippa,Pa. J5	5.50
Atlanta A11	5.70
Bessemer,Ala. T2	5.50
Bethlehem,Pa. B2	5.55
Birmingham C15	5.50
Clairton,Pa. U5	5.50
Fairfield,Ala. T2	5.50
Fontana,Calif. K1	6.30
Gary,Ind. U5	5.50
Geneva,Utah C11	5.50
Houston S5	5.60
Ind.Harbor,Ind. I-2, Y1	5.50
Johnstown,Pa. B2	5.55
Joliet,Ill. P22	5.50
KansasCity,Mo. S5	5.60
Lackawanna,N.Y. B2	5.55
LosAngeles B3	6.20
Minnequa,Colo. C10	5.80
Munhall,Pa. U5	5.50
Niles,Calif. P1	6.25
Phoenixville,Pa. P4	5.55
Portland,Oreg. O4	6.25
Seattle B3	6.25
S.Chicago,Ill. U5, W14	5.50
S.SanFrancisco B3	6.15
Sterling,Ill. N15	5.50
Struthers,O. Y1	5.50
Torrance,Calif. C11	6.20
Weirton,W.Va. W6	5.50

Wide Flange

Bethlehem,Pa. B2	5.55
Clairton,Pa. U5	5.50
Fontana,Calif. K1	6.45
IndianaHarbor,Ind. I-2	5.50
Lackawanna,N.Y. B2	5.55
Munhall,Pa. U5	5.50
Phoenixville,Pa. P4	5.55
S.Chicago,Ill. U5	5.50
Sterling,Ill. N5	5.50
Weirton,W.Va. W6	5.50

Alloy Std. Shapes

Aliquippa,Pa. J5	6.80
Clairton,Pa. U5	6.80
Gary,Ind. U5	6.80
Houston S5	6.90
Munhall,Pa. U5	6.80
S.Chicago,Ill. U5, W14	6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5	8.05
Bessemer,Ala. T2	8.05
Bethlehem,Pa. B2	8.10
Clairton,Pa. U5	8.05
Fairfield,Ala. T2	8.05
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.05
Geneva,Utah C11	8.05
Houston S5	8.15
Ind.Harbor,Ind. I-2, Y1	8.05
Johnstown,Pa. B2	8.10
KansasCity,Mo. S5	8.15
Lackawanna,N.Y. B2	8.10
LosAngeles B3	8.75
Munhall,Pa. U5	8.05
Phoenixville,Pa. P4	8.10
Seattle B3	8.80
S.Chicago,Ill. U5, W14	8.05
S.SanFrancisco B3	8.70
Sterling,Ill. N15	7.75
Struthers,O. Y1	8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2	8.10
Ind.Harbor,Ind. I-2	8.05
Lackawanna,N.Y. B2	8.10
Munhall,Pa. U5	8.05
S.Chicago,Ill. U5	8.05
Sterling,Ill. N15	7.75

PILING

BEARING PILES

Bethlehem,Pa. B2	5.55
Ind.Harbor,Ind. I-2	5.50
Lackawanna,N.Y. B2	5.55
Munhall,Pa. U5	5.50
S.Chicago,Ill. I-2, U5	5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	6.50
Lackawanna,N.Y. B2	6.50
Munhall,Pa. U5	6.50
S.Chicago,Ill. I-2, U5	6.50
Weirton,W.Va. W6	6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2	5.30
Aliquippa,Pa. J5	5.30
Ashland,Ky.(15) A10	5.30
Atlanta A11	5.50
Bessemer,Ala. T2	5.30
Clairton,Pa. U5	5.30
Claymont,Del. P4	5.30
Cleveland J5, R2	5.30
Coatesville,Pa. L7	5.30
Conshohocken,Pa. A3	5.30
Ecorse,Mich. G5	5.30
Fairfield,Ala. T2	5.30
Farrell,Pa. S3	5.30
Fontana,Calif.(30) K1	6.10
Gary,Ind. U5	5.30
Geneva,Utah C11	5.30
GraniteCity,Ill. G4	5.40
Houston S5	5.40
Ind.Harbor,Ind. I-2, Y1	5.30
Johnstown,Pa. B2	5.30
Lackawanna,N.Y. B2	5.30
Mansfield,O. E6	5.30
Minnequa,Colo. C10	6.15
Munhall,Pa. U5	5.30
Newport,Ky. A2	5.30
Pittsburgh J5	5.30
Riverdale,Ill. A1	5.30
Seattle B2	6.20
Sharon,Pa. S3	5.30
S.Chicago,Ill. U5, W14	5.30
SparrowsPoint,Md. B2	5.30
Sterling,Ill. N15	5.30
Steubenville,O. W10	5.30
Warren O. R2	5.30
Youngstown U5, Y1	5.30
Youngstown(27) R2	5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4	7.05
Fontana,Calif. K1	7.85
Geneva,Utah C11	7.65
Houston S5	7.15
Johnstown,Pa. B2	7.05
SparrowsPoint,Md. B2	7.05

PLATES, Wrought Iron

Economy,Pa. B14	14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5	7.95
Ashland,Ky. A10	7.95
Bessemer,Ala. T2	7.95
Clairton,Pa. U5	7.95
Claymont,Del. P4	7.95
Cleveland J5, R2	7.95
Coatesville,Pa. L7	7.95
Conshohocken,Pa. A3	7.95
Economy,Pa. B14	7.95
Ecorse,Mich. G5	7.95
Fairfield,Ala. T2	7.95
Farrell,Pa. S3	7.95
Fontana,Calif.(30) K1	8.75
Gary,Ind. U5	7.95
Geneva,Utah C11	7.95
Houston S5	8.05
Ind.Harbor,Ind. I-2, Y1	7.95
Johnstown,Pa. B2	7.95
Munhall,Pa. U5	7.95
Pittsburgh J5	7.95
Seattle B3	8.85
Sharon,Pa. S3	7.95
S.Chicago,Ill. U5, W14	7.95
SparrowsPoint,Md. B2	7.95
Sterling,Ill. N15	7.625
Warren,O. R2	7.95
Youngstown U5, Y1	7.95

PLATES, Alloy

Aliquippa, Pa. J5	7.50
Claymont,Del. P4	7.50
Coatesville,Pa. L7	7.50
Economy,Pa. B14	7.50
Farrell,Pa. S3	7.50
Fontana,Calif. K1	8.30
Gary,Ind. U5	7.50
Houston S5	7.60
Ind.Harbor,Ind. Y1	7.50
Johnstown,Pa. B2	7.50
Lowellville,O. S3	7.50
Munhall, Pa. U5	7.50
Newport,Ky. A2	7.50
Pittsburgh J5	7.50
Seattle B3	8.40
Sharon,Pa. S3	7.50
S.Chicago,Ill. U5, W14	7.50
SparrowsPoint,Md. B2	7.50
Youngstown Y1	7.50

PLATES, Ingot Iron

Ashland c.l.(15) A10	5.55
Ashland l.c.l.(15) A10	6.05
Cleveland c.l. R22	6.05
Warren,O. R2	6.05

FLOOR PLATES

Cleveland J5	6.375
Claymont,Del. P4	6.375
Conshohocken,Pa. A3	6.375
Ind.Harbor,Ind. I-2	6.375
Munhall,Pa. U5	6.375
Pittsburgh J5	6.375
S.Chicago,Ill. U5	6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.675
Aliquippa,Pa.(9) J5	5.675
Alton,Ill. L1	5.875
Atlanta(9) A11	5.875
Bessemer,Ala.(9) T2	5.675
Birmingham(9) C15	5.675
Buffalo(9) R2	5.675
Canton,O.(23) R2	6.15
Clairton,Pa.(9) U5	5.675
Cleveland(9) R2	5.675
Ecorse,Mich.(9) G5	5.675
Emeryville,Calif. J7	6.425
Fairfield,Ala.(9) T2	5.675
Fairless,Pa.(9) U5	5.825
Fontana,Calif.(9) K1	6.375
Gary,Ind.(9) U5	5.675
Houston(9) S5	5.925
Ind.Harbor(9) I-2, Y1	5.675
Johnstown,Pa.(9) B2	5.675
Joliet,Ill. P2	5.675
KansasCity,Mo.(9) S5	5.925
Lackawanna(9) B2	5.675
LosAngeles(9) B3	6.375
Massillon,O.(23) R2	6.15
Midland,Pa.(23) C18	6.025
Milton,Pa. M18	5.825
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
Owensboro,Ky.(9) G8	6.025
Pittsburg,Calif.(9) C11	6.375
Pittsburgh(9) J5	5.675
Portland,Oreg. O4	6.425
Riverdale,Ill.(9) A1	5.675
Seattle(9) A24,B3,N15	6.425
S.Ch'c'go(9)R2,U5,W14	5.675
S.Duquesne,Pa.(9) U5	5.675
S.SanFran.,Calif.(9) B3	6.425
Sterling,Ill.(1)(9) N15	5.675
Sterling,Ill.(9) N15	5.775
Struthers,O.(9) Y1	5.675
Tonawanda,N.Y. B12	5.675
Torrance,Calif.(9) C11	6.375
Warren,O. C17	6.025
Youngstown(9) R2, U5	5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5	6.725
Bethlehem,Pa. B2	6.725
Bridgeport,Conn. C32	6.80
Buffalo R2	6.725
Canton,O. R2, T7	6.725
Clairton,Pa. U5	6.725
Detroit S41	6.725
Economy,Pa. B14	6.725
Ecorse,Mich. G5	6.725
Farrell,Pa. S3	6.725
Fontana,Calif. K1	7.775
Gary,Ind. U5	6.725
Houston S5	6.975
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
KansasCity,Mo. S5	6.975
Lackawanna,N.Y. B2	6.725
LosAngeles B3	7.775
Lowellville,O. S3	6.725
Massillon,O. R2	6.725
Midland,Pa. C18	6.725
Owensboro,Ky. G8	6.725
Pittsburgh J5	6.725
Seattle(6) B3	7.825
Sharon,Pa. S3	6.725
S.Chicago R2, U5, W14	6.725
S.Duquesne,Pa. U5	6.725
Struthers,O. Y1	6.725
Warren,O. C17	6.725
Youngstown U5	6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5	8.30
Bessemer,Ala. T2	8.30
Bethlehem,Pa. B2	8.30
Clairton,Pa. U5	8.30
Cleveland R2	8.30
Ecorse,Mich. G5	8.30
Fairfield,Ala. T2	8.30
Fontana,Calif. K1	9.00
Gary,Ind. U5	8.30
Houston S5	8.55
Ind.Harbor,Ind. Y1	8.30
Johnstown,Pa. B2	8.30
KansasCity,Mo. S5	8.55
Lackawanna,N.Y. B2	8.30
LosAngeles B3	9.00
Pittsburgh J5	8.30
Seattle B3	9.05
S.Chicago,Ill. R2, W14	8.30
S.Duquesne,Pa. U5	8.30
S.SanFrancisco B3	9.05
Sterling,Ill. N15	7.925
Struthers,O. Y1	8.30
Youngstown U5	8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	5.825
Houston(9) S5	5.925
KansasCity,Mo.(9) S5	5.925
Lackawanna(9) B2	5.675
Sterling,Ill. N15	5.775
Sterling,Ill.(1) N15	5.675
Tonawanda,N.Y. B12	5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5	5.675
Atlanta A11	5.875
Joliet,Ill. P22	5.675
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
Pittsburgh J5	5.675
Portland,Oreg. O4	6.425
SanFrancisco S7	6.52
Seattle B3	6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14	16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5	6.80
Clairton,Pa. U5	6.80
Gary,Ind. U5	6.80
Houston S5	7.05
KansasCity,Mo. S5	7.05
Pittsburgh J5	6.80
Youngstown U5	6.80

BARS, C.F. Leaded (Including leaded extra)

Carbon

LosAngeles P2, S30	11.75*

Alloy

Ambridge,Pa. W18	10.175
BeaverFalls,Pa. M12	10.175
Camden,N.J. P13	10.35
Chicago W18	10.175
Elyria,O. W8	10.175
Monaca,Pa. S17	10.175
Newark,N.J. W18	10.35
SpringCity,Pa. K3	10.35

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*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	7.65
BeaverFalls,Pa. M12,R2	7.65
Birmingham C15	8.25
Buffalo B5	7.70
Camden,N.J. P13	8.10
Carnegie,Pa. C12	7.65
Chicago W18	7.65
Cleveland A7, C20	7.65
Detroit B5, H5, P17	7.85
Detroit S41	7.65
Donora,Pa. A7	7.65
Elyria,O. W8	7.65
FranklinPark,Ill. N5	7.65
Gary,Ind. R2	7.65
GreenBay,Wis. F7	7.65
Hammond,Ind. J5, L2	7.65
Hartford,Conn. R2	8.15
Harvey,Ill. B5	7.65
LosAngeles(49) S30	9.10
LosAngeles(49) P2, R2	9.10
Mansfield,Mass. B5	8.20
Massillon,O. R2, R8	7.65
Midland,Pa. C18	7.65
Monaca,Pa. S17	7.65
Newark,N.J. W18	8.10
NewCastle,Pa.(17) B4	7.65
Pittsburgh J5	7.65
Plymouth,Mich. P5	7.90
Putnam,Conn. W18	8.20
Readville,Mass. C14	8.20
Seattle(49) S30	9.10
S.Chicago,Ill. W14	7.65
SpringCity,Pa. K3	8.10
Struthers,O. Y1	7.65
Warren,O. C17	7.65
Waukegan,Ill. A7	7.65
Willimantic,Conn. J5	8.15
Youngstown F3, Y1	7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19	6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	9.025
BeaverFalls,Pa. M12,R2	9.025
Bethlehem,Pa. B2	9.025
Bridgeport,Conn. C32	9.175
Buffalo B5	9.025
Camden,N.J. P13	9.20
Canton,O. T7	9.025
Carnegie,Pa. C12	9.025
Chicago W18	9.025
Cleveland A7, C20	9.25
Detroit B5, P17	9.225
Detroit H5, S41	9.025
Donora,Pa. A7	9.025
Elyria,O. W8	9.025
FranklinPark,Ill. N5	9.025
Gary,Ind. R2	9.025
GreenBay,Wis. F7	9.025

Hammond,Ind. J5, L2	9.025
Hartford,Conn. R2	9.325
Harvey,Ill. R5	9.025
Lackawanna,N.Y. B3	9.025
LosAngeles P2, S30	11.00
Mansfield,Mass. B5	9.325
Massillon,O. R2, R8	9.025
Midland,Pa. C18	9.025
Monaca,Pa. S17	9.025
Newark,N.J. W18	9.20
Plymouth,Mich. P5	9.225
S.Chicago,Ill. W14	9.025
SpringCity,Pa. K3	9.20
Struthers,O. Y1	9.025
Warren,O. C17	9.025
Waukegan,Ill. A7	9.025
Willimantic,Conn. J5	9.325
Worcester,Mass. A7	9.325
Youngstown F3, Y1	9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11	5.00
Birmingham C15	5.25
Ecorse,Mich. G5	5.675
Emeryville,Calif. J7	6.425
Fontana,Calif. K1	6.375
Ind.Harbor,Ind. Y1	5.675
Johnstown,Pa. B2	5.675
Joliet,Ill. P22	5.675
Kokomo,Ind. C16	5.775
Lackawanna,N.Y. B2	5.675
LosAngeles B3	6.375
Madison,Ill. L1	5.475
Milton,Pa. M18	5.825
Minnequa,Colo. C10	6.125
Niles,Calif. P1	6.375
Pittsburgh J5	5.675
Portland,Oreg. O4	6.425
Seattle A24, B3, N14	6.425
S.Chicago,Ill. W14	5.675
S.SanFrancisco B3	6.425
SparrowsPoint,Md. B2	5.675
Steelton,Pa. B2	5.675
Sterling,Ill. (1) N15	5.675
Sterling,Ill. N15	5.775
Struthers,O. Y1	5.675
Tonawanda,N.Y. B12	6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2	7.42
Boston B2, U8	8.15
Chicago U8	7.41
Cleveland U8	7.39
Johnstown,Pa. B2	7.33
Lackawanna,N.Y. B2	7.35
Marion,O. P11	6.70
Newark,N.J. U8	7.80
Philadelphia U8	7.63
Pittsburgh J5, U8	7.35
Seattle A24, B3, N14	7.95
SparrowsPoint,Md. B2	7.33
St.Paul U8	8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14	16.10
Economy,Pa.(D.R.)B14	20.50
Econ.(DirectRolled)B14	13.55
Economy(Staybolt) B14	20.50
McK.Rks.(S.R.) L5	16.10
McK.Rks.(D.R.) L5	20.50
McK.Rks.(DirRolled)L5	13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2	5.575
ChicagoHts.(4)(44) I-2	5.675
ChicagoHts.(4) C2	5.675
Franklin,Pa.(3) F5	5.575
Franklin,Pa.(4) F5	5.675
JerseyShore,Pa.(3) J8	5.55
Marion,O.(3) P11	5.575
Tonawanda(3) B12	5.575
Tonawanda(4) B12	6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2	5.10
Allenport,Pa. P7	5.10
Aliquippa,Pa. J5	5.10
Ashland,Ky.(8) A10	5.10
Cleveland J5, R2	5.10
Conshohocken,Pa. A3	5.15
Detroit(8) M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Fairless,Pa. U5	5.15
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Geneva,Utah C11	5.20
GraniteCity,Ill.(8) G4	5.20
Ind.Harbor,Ind. I-2, Y1	5.10
Irvin,Pa. U5	5.10
Lackawanna,N.Y. B2	5.10
Mansfield,O. E6	5.10
Munhall,Pa. U5	5.10
Newport,Ky. A2	5.10
Niles,O. M21, S3	5.10
Pittsburg,Calif. C11	5.80
Pittsburgh J5	5.10
Portsmouth,O. P12	5.10
Riverdale,Ill. A1	5.10
Sharon,Pa. S3	5.10
S.Chicago,Ill. U5, W14	5.10
SparrowsPoint,Md. B2	5.10
Steubenville,O. W10	5.10
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3	6.275

SHEETS, H.R. Alloy

Gary,Ind. U5	8.40
Ind.Harbor,Ind. Y1	8.40
Irvin,Pa. U5	8.40
Munhall,Pa. U5	8.40
Newport,Ky. A2	8.40
Youngstown U5, Y1	8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5	7.525
Ashland,Ky. A10	7.525
Cleveland J5, R2	7.525
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.525
Fairless,Pa. U5	7.575
Farrell,Pa. S3	7.525
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.525
Ind.Harbor,Ind. I-2, Y1	7.525
Irvin,Pa. U5	7.525
Lackawanna(35) B2	7.525
Munhall,Pa. U5	7.525
Niles,O. S3	7.525
Pittsburgh J5	7.525
S.Chicago,Ill. U5, W14	7.525
Sharon,Pa. S3	7.525
SparrowsPoint(36) B2	7.525
Warren,O. R2	7.525
Weirton,W.Va. W6	7.525
Youngstown U5, Y1	7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	5.35
Cleveland R2	5.875
Warren,O. R2	5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	7.05
Middletown,O. A10	6.775
Warren,O. R2	7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2	6.275
Aliquippa,Pa. J5	6.275
Allenport,Pa. P7	6.275
Cleveland J5, R2	6.275
Conshohocken,Pa. A3	6.325
Detroit M1	6.275
Ecorse,Mich. G5	6.275
Fairfield,Ala. T2	6.275
Fairless,Pa. U5	6.325
Follansbee,W.Va. F4	6.275
Fontana,Calif. K1	7.40
Gary,Ind. U5	6.275
GraniteCity,Ill. G4	6.375
Ind.Harbor,Ind. I-2, Y1	6.275
Irvin,Pa. U5	6.275
Lackawanna,N.Y. B2	6.275
Mansfield,O. E6	6.275
Middletown,O. A10	6.275
Newport,Ky. A2	6.275
Pittsburg,Calif. C11	7.225
Pittsburgh J5	6.275
Portsmouth,O. P12	6.275
SparrowsPoint,Md. B2	6.275
Steubenville,O. W10	6.275
Warren,O. R2	6.275
Weirton,W.Va. W6	6.275
Yorkville,O. W10	6.275
Youngstown Y1	6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5	9.275
Cleveland J5, R2	9.275
Ecorse,Mich. G5	9.275
Fairless,Pa. U5	9.325
Fontana,Calif. K1	10.40
Gary,Ind. U5	9.275
Ind.Harbor,Ind. I-2, Y1	9.275
Lackawanna(38) B2	9.275
Pittsburgh J5	9.275
SparrowsPoint(33) B2	9.275
Warren,O. R2	9.275
Weirton,W.Va. W6	9.275
Youngstown Y1	9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2	7.475

SHEETS, Enameling

Ashland,Ky. A10	6.775
Cleveland R2	6.775
Fairfield,Ala. T2	6.775
Gary,Ind. U5	6.775
Ind.Harbor,Ind. I-2, Y1	6.775
Irvin,Pa. U5	6.775
Middletown,O. A10	6.775
Niles,O. M21, S3	6.775
SparrowsPoint,Md. B2	6.775
Youngstown Y1	6.775

BLUED STOCK, 29 Gage

Dover,O. E6	8.70
Ind.Harbor,Ind. I-2	8.70
Mansfield,O. E6	8.70
Warren,O. R2	8.70
Yorkville,O. W10	8.70

SHEETS, Longe Terne, Steel

Follansbee,W.Va. W10	7.225
Gary,Ind. U5	7.225
Mansfield,O. E6	7.225
Middletown,O. A10	7.225
Niles,O. M21, S3	7.225
Warren,O. R2	7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)	9.525
Butler,Pa. A10 (type 2)	9.625
Irvin,Pa. U5 (type 1)	9.525

SHEETS, Well Casing

Fontana,Calif. K1	7.325
Geneva,Utah C11	6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5	10.125
Pittsburgh J5	10.125
SparrowsPt.(39) B2	10.025

SHEETS, Galvannealed Steel

Canton,O. R2	7.175
Irvin,Pa. U5	7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10	7.125
Middletown,O. A10	7.125

SHEETS, Electrogalvanized

Canfield,O. C3	7.50
Cleveland (28) R2	7.65
Niles,O. (28) R2	7.65
Weirton,W.Va. W6	7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2	6.875‡
Ashland,Ky. A10	6.875‡
Canton,O. R2	6.875‡
Dover,O. E6	6.875†
Fairfield,Ala. T2	6.875†
Gary,Ind. U5	6.875†
GraniteCity,Ill. G4	6.975*
Ind.Harbor,Ind. I-2	6.875†
Irvin,Pa. U5	6.875†
Kokomo,Ind. C16	6.975‡
MartinsFerry,O. W10	6.875*
Middletown,O. A10	6.875†
Pittsburg,Calif. C11	7.625*
Pittsburgh J5	6.875†
SparrowsPt.,Md. B2	6.875†
Warren,O. R2	6.875†
Weirton,W.Va. W6	6.875*

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*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1	Acme Steel Co.
A2	Acme-Newport Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A5	Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6	American Shim Steel Co.
A7	American Steel & Wire Div., U. S. Steel Corp.
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A24	Alaska Steel Mills Inc.
A25	Algoma Steel Corp. Ltd.
B1	Babcock & Wilcox
B2	Bethlehem Steel Co.
B3	Bethlehem Steel Co., Pacific Coast Div.
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B8	Braeburn Alloy Steel
B9	Brainard Steel Div., Sharon Steel Corp.
B10	E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12	Buffalo Steel Corp.
B14	A. M. Byers Co.
B15	J. Bishop & Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div., Borg-Warner Corp.
C3	Canfield Steel Co.
C4	Carpenter Steel Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C15	Connors Steel Div., H. K. Porter Co., Inc.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C23	Charter Wire Inc.
C24	G. O. Carlson Inc.
C32	Carpenter Steel of N. Eng.
D2	Detroit Steel Corp.
D4	Disston Div., H. K. Porter Co. Inc.
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
D8	Damascus Tube Co.
D9	Wilbur B. Driver Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E6	Empire-Reeves Steel
E10	Enamel Prod. & Plating
F2	Firth Sterling Inc.
F3	Fitzsimmons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div., Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
F8	Ft. Wayne Metals Inc.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
G8	Green River Steel Corp.
H1	Hanna Furnace Corp.
H5	Hercules Drawn Steel
H7	Helical Tube Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
I-6	Ivins Steel Tube Works
I-7	Indiana Steel & Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K7	Kenmore Metals Corp.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.
L8	Leschen Wire Rope Div., H. K. Porter Co. Inc.
M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M6	Mercer Pipe Div., Sawhill Tubular Products
M8	Mid-States Steel & Wire
M12	Moltrup Steel Products
M14	McInnes Steel Co.
M16	Md. Fine & Specialty Wire Co. Inc.
M17	Metal Forming Corp.
M18	Milton Steel Div., Merritt-Chapman&Scott
M21	Mallory-Sharon Metals Corp.
M22	Mill Strip Products Co.
M23	Mill Strip Products Co. of Pennsylvania
N1	National Standard Co.
N2	National Supply, Armco Steel Corp.
N3	National Tube Div., U. S. Steel Corp.
N5	Nelsen Steel & Wire Co.
N6	New England High Carbon Wire Co.
N8	Newman-Crosby Steel
N14	Northwest. Steel Rolling Mills Inc.
N15	Northwestern S.&W. Co.
N20	Neville Ferro Alloy Co.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Steel Corp.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke&Chem.
P7	Pittsburgh Steel Co.
P11	Pollak Steel Co.
P12	Portsmouth Div., Detroit Steel Corp.
P13	Precision Drawn Steel
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., American Chain & Cable
P17	Plymouth Steel Corp.
P19	Pitts. Rolling Mills
P20	Prod. Steel Strip Corp.
P22	Phoenix Mfg. Co.
P24	Phil.Steel & Wire Corp.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R8	RelianceDiv.,EatonMfg.
R9	Rome Mfg. Co.
R10	Rodney Metals Inc.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S4	Sharon Tube Co.
S5	Sheffield Div. Armco Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw&SteelCo.
S12	Spencer Wire Corp.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S17	Superior Drawn Steel Co.
S18	Superior Steel Div., Copperweld Steel Co.
S19	Sweet's Steel Co.
S20	Southern States Steel
S23	Superior Tube Co.
S25	Stainless Welded Prod.
S26	Specialty Wire Co. Inc.
S30	Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40	Seneca Steel Service
S41	Stainless & Strip Div., J & L Steel Corp.
S42	Southern Elec. Steel Co.
S43	Seymour Mfg. Co.
S44	Screw & Bolt Corp. of America
S45	Somers Brass Co.
S46	Steel Co. of Canada
T2	Tenn. Coal & Iron Div. U. S. Steel Corp.
T3	Tenn. Products & Chemical Corp.
T4	Texas Steel Co.
T5	Thomas Strip Div., Pittsburgh Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div., Am. Rad. & Stan. San.
T13	Tube Methods Inc.
T19	Techalloy Co. Inc.
U3	Union Wire Rope, Armco Steel Corp.
U4	Universal-Cyclops Steel
U5	U. S. Steel Corp.
U6	U. S. Pipe & Foundry
U7	Ulbrich Stainless Steels
U8	U. S. Steel Supply Div., U. S. Steel Corp.
U11	Union Carbide Metals Co.
U13	Union Steel Corp.
V2	Vanadium-Alloy Steel
V3	Vulcan-Kidd Steel Div., H. K. Porter Co.
W1	Wallace Barnes Steel Div., Associated Spring
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Div., National Steel Corp.
W8	Western Automatic Machine Screw Co.
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.425
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.425
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Riverdale,Ill. A1	7.425
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown Y1	7.425
Youngstown S41	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. S8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

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*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorksville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLITIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11.	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented					
	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

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*Semiprocessed. †Fully processed only. §Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. LI	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N. J. R5	12.95
SparrowsPt.,Md.(10)B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.075
Portsmouth,O. P12	9.75
Roebling,N. J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.20
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.20
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S41	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) (per 97 lb net box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.
100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim
100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2 I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

6 to 8 gage	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in. larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:
Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,
Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:
⅜ in. and smaller,
6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1⅛ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26,20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in., and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

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*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling—		Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
	Ingot	Slabs							
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Prooducts; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	—Plates— Carbon Base 5%	—Plates— Carbon Base 10%	—Plates— Carbon Base 15%	—Plates— Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	36.10	43.00

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*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

—Grade by Analysis (%)— W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago R2	66.00	66.50	66.50	67.00
S.Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W.Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie, Ont. A25	65.00	65.00	65.50	66.00

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*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.[illegible]5	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.06	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.06	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Pa., $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅜ in. grains bulk, Luning, Nev., $46; ⅜ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

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*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple;
unboxed, f.o.b. plant

GRAPHITE

——Inches——		Per
Diam	Length	100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	7.50††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	55.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	54.70
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

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*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.60	$5.65	$5.55	$5.45	$5.75
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.65	5.70	5.60	5.50	5.80
I-Beams	5.60	5.65	5.55	5.45	5.75
Channels	5.60	5.65	5.55	5.45	5.75
Plates (basic bessemer)	5.55	5.60	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.20	6.15	6.05	5.90	6.25
Merchant Bars	6.15	6.20	6.10	6.00	6.30
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.15	7.20	7.10	7.00	7.30

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†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$15.75-16.25**
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

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*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102,50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk. 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr. carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.05% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si, Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F. o. b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c. ,

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

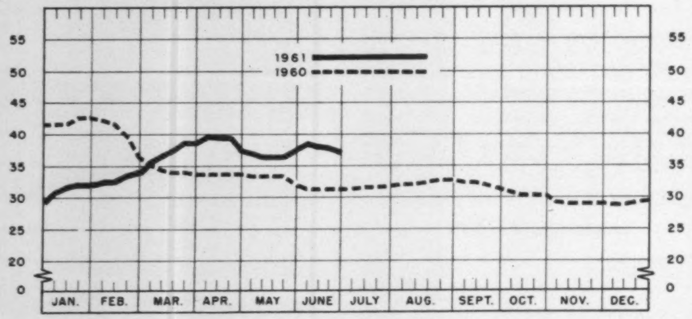
Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



June 28 1961	Week Ago	Month Ago	Year Ago	May Avg.
$37.00	$37.83	$37.33	$31.33	$36.67

Downturn in Scrap Prices Extended

STEEL's index on No. 1 heavy melting grade declines another 83 cents a ton to $37. Vacation curtailments at steelmaking plants cut consumption. Export movement slower

Scrap Prices, Page 91

• **Chicago**—The market continues weak, with several key grades of open hearth material quoted off $2 a ton. Cast iron grades are also down $1 a ton as demand drops from foundry vacation closings. Industrial No. 1 heavy melting is listed at $37, and dealer No. 1 at $35,

• **Philadelphia** — Prices are easier, especially on some of the open hearth grades and railroad specialties. No. 1 heavy melting steel is holding at $39, delivered, No. 2 heavy melting at $35, and No. 2 bundles at $24-$26.

Export demand is slowing down. Shipments were off at this port in June and are likely to be still smaller this month.

• **Cleveland**—Scrapmen don't look for much buying activity this month because many metalworking plants are closed for vacations. Sluggish steelmaking operations restrict the movement of scrap, especially with steelmakers depending heavily on hot metal for their open hearth charges. Bids on the July industrial scrap lists (which involve smaller tonnage) will point the way for prices over coming weeks.

• **Pittsburgh**—Brokers' bids on the July list of No. 1 factory bundles from the local plant of GM's Fisher Body Div. are expected to be $1 to $2 a ton above last month's. Since only 3300 tons are being offered vs. 6300 in June, speculative interest may be high. The major consumer here has negotiated a special, 60 day freight rate ($7 a gross ton) on shipments of revert scrap to its Eastern mills. They have been shipping slabs and billets here for rolling.

• **Detroit** — Auto lists are closing, with dealers and brokers expecting prices to hold last month's level or decline slightly. The tonnages offered are about one-half to two-thirds those bid on a month ago. Fisher Body's lists are about 50 per cent off. Chrysler lists 277 cars of bundles vs. 377 in June.

• **Buffalo** — A leading district consumer of cast iron scrap last week paid $38 a ton for cupola grade cast, $1 less than its last previous purchase. The price of No. 1 machinery cast also declined $1 to $44-$45.

• **New York**—Influenced by a fairly steady flow of export scrap from this port, brokers' buying prices on the major steel grades continue unchanged. Prices on other grades show little variation, and in borings and turnings, the market is purely nominal. Vacation suspensions at foundries haven't had any particular influence on scrap prices in the East.

• **Cincinnati**—Despite the lack of a buying test, prices are holding. Two area mills are expected to reenter the market for July tonnage and the trade thinks volume will at least equal that in June. Industrial lists are likely to be thin, and should mean greater call for dealer scrap.

• **St. Louis** — The market is in a lull, and some traders think it may herald another price decline. There's plenty of scrap around, and only small tonnage is moving out of the area on domestic and export account. A further reduction of $1 a ton on shipments of 1000 tons or more is due in barge rates Aug. 1.

• **Birmingham** — Some scrap shipments are being held up because of suspensions for vacations. Export demand has also slowed down. So there's not much activity in the market. No. 1 heavy melting steel, however, is up $1 a ton, while angles and splice bars are quoted $2 higher.

• **Houston**—The local market is a little easier with exporters getting only token competition for available metal from domestic consumers. Indications are that no significant mill buying will be done until well on toward the end of this month. In the Houston area, the export price for No. 1 heavy melting is $36-$37; $40 is quoted in Baton Rouge and New Orleans. The domestic price for No. 1 steel is holding at $35.

• **Los Angeles**—A resurgence in export demand is strengthening the local market even though domestic mills are not expected to do much buying until late in the summer. Yard stocks are low, and intake is limited. No. 1 heavy melting is quoted $40-$42, No. 2 heavy melting $39, No. 1 bundles $40, No. 2 bundles $26-$28, cut structurals and plates $50, and No. 1 cupola $44-$46.

• **San Francisco** — Prices on scrap are holding firm here, buoyed by shipments on export account. Japan is expected to take less tonnage in

(Please turn to Page 95)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, June 28, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 28	$37.00
June 21	37.83
May Avg.	36.67
June 1960	31.33
June 1956	46.04

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	36.00-37.00
No. 1 factory bundles	42.00-43.00
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*14.00-15.00*
Short turnings	*19.00-20.00*
Cast iron borings	*18.00-19.00*
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	37.00-38.00
Heavy turnings	27.00-28.00
Punching & plate scrap	41.00-42.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00§

Railroad Scrap

No. 1 R.R. heavy melt	39.00-40.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	42.00-43.00
Rails, reroiling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy. melt., indus.	*36.00-37.00*
No. 1 hvy. melt., dealer	*34.00-35.00*
No. 2 hvy. melting	30.00-31.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	21.00-22.00
No. 1 busheling, indus.	*36.00-37.00*
No. 1 busheling, dealer	*34.00-35.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	43.00-44.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	*36.00-37.00*
Unstripped motor blocks	*33.00-34.00*
Clean auto cast	*46.00-47.00*
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	*56.00-57.00*
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*37.00-38.00*
No. 1 machinery	*44.00-45.00*

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	62.00-63.00
Railroad specialties	41.00-42.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	*41.00-42.00*
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	39.00-40.00
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	46.00-47.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*160.00-165.00*
18-8 turnings	*95.00-100.00*
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	38.00-39.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.50-29.50
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	43.00
No. 2 bundles	*24.00-26.00*
No. 1 busheling	43.00
Electric furnace bundles	43.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	*51.00-53.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00.42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	40.50-41.50
Angles, splice bars	*44.00-45.00*

HOUSTON
(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	*23.00-24.00*
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	40.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	*40.00-42.00*
No. 2 heavy melting	*39.00*
No. 1 bundles	*40.00*
No. 2 bundles	*26.00*
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	*50.00*

Cast Iron Grades

No. 1 cupola	*44.00-46.00*

Railroad Scrap

No. 1 R. R. heavy melt.	42.00

PORTLAND, OREG.
(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	44.00**
No. 2 heavy melting	41.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.
(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

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*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

"Lead-zinc is a sick guinea pig under the reciprocal trade program. No other domestic industry has suffered such heavy economic damage under this program. No other industry has made such convincing proof of injury before the Tariff Commission, which has repeatedly made findings in its favor."

Rep. Ed Edmondson (D., Okla.)

Kennedy Squelches Lead-Zinc Hopes

Nonferrous Metal Prices, Pages 94 & 95

PRESIDENT KENNEDY has revealed a program that would virtually kill the chances of administration support for lead-zinc subsidies and tariffs. Even more significant, it probably will halt other metals legislation and may set the pattern for our reciprocal trade program.

A lot of bruised feelings have resulted, even among people in the President's own party; some angry first reactions have been heard from business; and some warnings that this may jeopardize Western support for the President's whole foreign aid program have been sounded. The reactions may cause Mr. Kennedy to back off.

• Political Hot Potato — President Kennedy is finding a solution to the lead-zinc problem just as hard to come by as did ex-President Eisenhower. In this instance, Mr. Kennedy is aligned with the policies of his predecessor, who opposed tariffs and subsidies. But there's one important difference: Mr. Eisenhower made no pledge to aid the lead-zinc industry; Mr. Kennedy did! During last fall's campaign, Mr. Kennedy stated he would not have vetoed the Edmonson Bill (which authorized subsidies to small lead-zinc producers), as did Mr. Eisenhower. Naturally, that led mine state congressmen to believe they had a friend in the young senator from Massachusets, a feeling he encouraged.

• Moment of Truth—Now he seems to have reneged, say lead-zinc partisans. Mr. Kennedy's braintrusters have come through with a proposal that seems to be as unpopular as it is confusing. Last week, Presidential Assistant Mike Feldman and John Kelly, assistant interior secretary, met with congressmen from nine lead-zinc producing states and outlined this four point program:

1. Purchase of $65 million worth of lead and zinc in the U. S. market over a 12 month period for stockpiling. The plan would be financed by selling surplus agricultural products abroad.
2. A special task force, probably made up of representatives from industry, labor, and government, would be established to see what type of relief could be granted to lead-zinc depressed areas.
3. The President would keep a close watch on developments in lead and zinc.
4. The price of silver would be allowed to rise.

• How Silver Gets In—Here, Mr. Kennedy's lead-zinc program really becomes puzzling. It's true that a great deal of the silver produced in this country comes as a byproduct of lead-zinc mining, and that a higher price for silver would certainly make operations more profitable. That wouldn't solve the problem of excess lead and zinc.

Astute observers point out that the lead-zinc problem is distinct from the silver problem. Under present laws, silver doesn't operate in a free market.

Free silver stocks held by Treasury are running out, say silvermen. They want controls off now so prices can rise gradually to bring out more silver production. Otherwise, some fear a runaway market when stocks are finally dissipated. Treasury indicates it will fight such a move.

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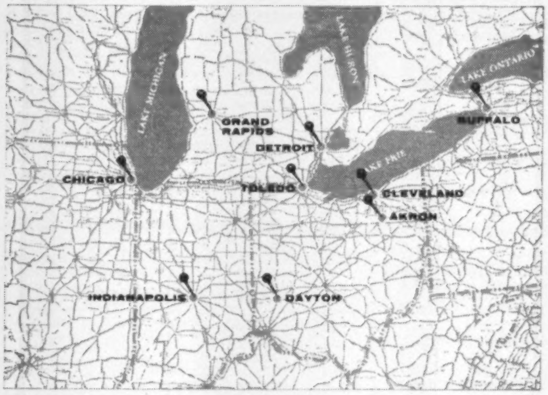

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg. 36.00-37.50 per gram; 1-10 kg. 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $197-200 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 119.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Die casting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max., 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R. .	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.00
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; 188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6.8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50-25.00; No. 2 heavy copper and wire, 22.50-23.00; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61–51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	56.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.625
Phos. Bronze, A-5% ...	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clippings, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 16.00-16.50; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.75-9.25; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 26.25; light copper, 24.00; refinery brass (60% copper) dry copper content, 24.50-25.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 25.75; light copper, 23.50; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 18.50; yellow brass turnings 16.00; radiators, 19.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 109.00; 500-1999 lb, 102.00; 2000-4999 lb, 98.50; 5000-29,999 lb, 97.50; 30,000 lb, 96.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 138.50; 200-499 lb, 137.00; 500-999 lb, 136.50; 1000-1999 lb, 136.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.30; 100-600 lb, 78.60; 700-1900 lb, 75.90; 2000-9900 lb, 74.00; 10,000 lb or more, 72.70.

Stannous Chloride (Anhydrous): 100 lb, 147.20; 400 lb, 137.20; 800-19,900 lb, 115.90; 20,000 lb or more, 111.70.

Stannous Sulphate: Less than 50 lb, 154.50; 50 lb, 124.50; 100-1900 lb, 122.50; 2000 lb or more, 120.50.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 90)

the third quarter, which is likely to exert pressure on the price structure unless domestic mills begin to expand their requirements.

- **Seattle**—Prices are unchanged in a quiet market. Exports are providing main support—domestic demand is light. Receipts are fair, but some items are in scarce supply.

Blast Furnace Production Scores Good Gain in May

Blast furnace production (pig iron and ferroalloys) increased in May to 5,693,628 net tons, highest since May, 1960, when 6,394,411 tons were turned out. Output in April was 4,725,150 tons.

Of the month's total, 47,238 tons were ferroalloys vs. 44,857 in April and 63,419 in May a year ago.

Production in the first five months of this year totaled 23,008,152 tons (189,040 ferroalloys). That compares with 36,264,736 (360,875 ferroalloys) in the same period last year.

Breakdown of production by states for April and the first five months:

Blast Furnace Production—May, 1961

(Net tons)

	May	1st Five Months
New York	333,557	1,229,532
Pennsylvania	1,316,137	5,489,608
Md., Va., W. Va. .	566,828	2,276,100
Ky., Tenn., Tex. ..	139,093	589,753
Alabama	259,869	1,324,223
Ohio	1,004,327	3,870,387
Indiana	778,836	3,228,777
Illinois	422,692	1,611,633
Mich., Minn.	455,508	1,669,323
Colo., Utah, Calif..	416,781	1,718,816
Total	5,693,628*	23,008,152*

---

*Includes 47,238 tons of ferroalloys.

**Includes 189,040 tons of ferroalloys.

Data from American Iron & Steel Institute.

Pig Iron . . .

Pig Iron Prices, Page 87

With many foundries closing for mass vacations, merchant pig iron demand is slow, and shipments are probably at the low point for the year. July sales may be about 15 per cent below June's. Iron suppliers are encouraged by indications that there will be an early start on 1962 model auto runs, which may stimulate iron demand.

A cargo of 1550 tons of Spanish iron arrived at New York recently.

CLASSIFIED ADVERTISING

For Sale

Exceptionally Modern Presses w/Air Clutches for immediate shipment at Big Savings, A Few New and built after 1951

Cap. Tons	Make	Type	Bed-Area Inch.	Stroke Inch.	Shut-Height Inch.
3000	Bliss	#671 mech. Knuckle Joint	54 x 67	10	50
1500	Bliss	#318 mech.	65 x 64	24	32
1500	Bliss	#HS 1500 Hydr.	60 x 60	24	71 DLO
720	Bliss	#312 mech.	44 x 50	14	28
720	Bliss	#312A mech.	48 x 50	14	24
700	HPM	CU-2X Hydr. Dbl. Action	36 x 36	36	72 DLO
500	Bliss	#310 mech.	37 x 36	14	24
500	HPM	CU-2X Hydr. Dbl. Action	36 x 36	36	72 DLO
500	Clearing	F1500-42 mech.	42 x 48	14	36
405	Bliss	#309 mech.	34 x 33	14	24
100	Clearing	#S1100-36 mech.	36 x 36	16	17

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Phone TEmpleton 8-5161

Representatives Wanted

SALES REPRESENTATIVE WANTED

Leading manufacturer of molding and core machines wants representative to cover Eastern New York, Eastern Pennsylvania, New Jersey, Maryland and Delaware territory. Excellent opportunity. Write, giving complete resume. Address: Box 943, STEEL, Penton Bldg. Cleveland 13, Ohio.

Help Wanted

PLANT MANAGER WANTED with master mechanic or machinist experience for machinery factory in southwest employing about 80. Box 941, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES
And Further information write
STEEL, Penton Bldg., Cleveland 13, O.

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EXCLUSIVE TERRITORY

An unusual line of equipment for all production facilities in the Foundry Field.

Territories available:

Ohio
Pennsylvania
New York
Illinois
California
Michigan

You will find an amazingly profitable opportunity with this rapidly expanding organization. If you wish to expand your line or are currently selling in this field, contact us at once. Send resume of your business history to Box 942, STEEL, Penton Bldg., Cleveland 13, Ohio.

Freight Car Orders and Deliveries Rise in May

Orders for freight cars in May increased to 3666 units vs. 2040 in April and 2209 in May, 1960, reports the American Railway Car Institute and the Association of American Railroads.

Deliveries also rose in the month, totaling 3360 against 2933 in April. They were off compared with 5931 in May a year ago.

Order backlogs as of June 1 amounted to 9626 cars on order in railroad shops and 4338 in commercial shops, a total of 13,964 units. That compares with 13,658 on order May 1 and with 36,106 on June 1, 1960.

Major types of cars on order June 1 included: 3921 plain boxcars, 3613 hopper cars, 1973 gondola cars, 1616 refrigerator cars, and 1179 flatcars.

Rails, Cars . . .

Track Material Prices, Page 85

The Erie-Lackawanna and the Santa Fe Railroads have each ordered 100 centersill piggyback cars (G85) from the General American Transportation Corp., Chicago. The G85 is designed to be operated automatically from the cab of the tractor which is loading or unloading the car. It also permits mounting of auto racks without modification.

Tubular Goods . . .

Tubular Goods Prices, Page 86

June bookings of oil country tubular goods were higher than they have been in any previous month this year. Sales exceeded May's by 10 to 15 per cent. The pickup probably reflects some price speculation, but tubemakers think it's mainly due to users' immediate needs; they have pared their inventories to the bone.

By offering independent distributors an extra 4 per cent discount on the oil country goods they stock, tubemakers had hoped to make the distributors more competitive with captive supply houses. But it's not working out that way. Instead of increasing their inventories, the independent distributors are trying to increase their sales by giving part or all of the new discount to customers. As long as they can get the 6 per cent discount they were being allowed before the additional 4 per cent was granted, they're happy. Some are reported so hungry for business they're giving away the 6 per cent and keeping only the 4.

In addition to allowing distributors an extra 4 per cent, tubemakers have also removed the 4 per cent markup they used to charge on steel they shipped to distributors or consumers from downriver terminals.

Iron Ore . . .

Iron Ore Prices, Page 88

The 1961 Great Lakes ore movement to June 1 amounted to only 5,450,014 gross tons vs, 18,151,132 tons on that date in 1960, reports the Lake Carriers' Association, Cleveland. Combined shipments of iron ore, coal, and grain on the lakes amounted to 17,907,793 net tons, a little over half the tonnage moved in the like period last year. Two reasons stand out: The fleet got a late start and slack demand for iron ore.

Plates . . .

Plate Prices, Page 82

Plate demand is adversely affected by the lag in railroad and ship specifications. However, prospects in both consuming lines appear to be a little brighter. Missilework is more encouraging, with at least 11,000 tons of high strength alloy plates on the point of being distributed. Tank and boiler work is spotty; no big improvement is expected over the next few weeks due to vacations.

Structural Bookings Hit 17 Month High During May

Structural steel bookings in May surged to 391,703 tons for a 17 month high, reports the American Institute of Steel Construction. They were about 82,000 tons greater than April's and were up 30 per cent over awards in the same month last year.

Bookings in the first five months this year totaled 1,561,270 tons, down a little more than 5 per cent from the 1,641,386 tons placed in the same period last year.

Virtually all types of steel construction showed substantial gains during May, with bridges and industrial buildings accounting for the largest share of new orders.

"Contributing to the upturn was the widening acceptance of new high strength steels," says H. G. Lewis, president of the institute. "These steels provide greater flexibility of design and increased economy in structural framing."

Shipments also rose during May, totaling 364,996 tons for the highest monthly total since August, 1960. The movement for the first five months this year was 1,497,801 tons, up 3 per cent from that in the like 1960 period.

Order backlogs as of May 31 totaled 2,457,795 tons, of which 1,346,468 (55 per cent) are scheduled for fabrication within the four months ended Sept. 30.

Structural Shapes . . .

Structural Shape Prices, Page 82

Fabricators report a slight gain in structural bookings. Substantial bridge tonnage is being placed in New England though the federal highway program is lagging in some areas. Estimates are in on a heavy volume of work, but the closing of contracts is retarded by inquiry into high prices prevailing in land purchases. An estimated 8500 tons are being delayed in reaching fabricating shops in New England alone.

Shop backlogs are unevenly distributed, due primarily to price competition. Pennsylvania State bridge construction includes considerable prestressed concrete work. For the second time, the Massachusetts Turnpike Authority has failed to market a bond issue for extension of the highway from Weston, Mass., to downtown Boston.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

300 tons, keg handling building, Liebman Brewery, Brooklyn, N. Y., to Belmont Iron Works, Eddystone, Pa.

250 tons, joists, Westerly Parkway Junior High School, State College, Pa., through Boyd H. Kline, Bloomsburg, Pa., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

107 tons, county bridge over Bear Creek, Berks County, Pennsylvania, to High Welding Co., Lancaster, Pa.

STRUCTURAL STEEL PENDING

1127 tons, state bridgework, Butler County, Pennsylvania, bids July 20; 497 tons of reinforcing bars also required.

600 tons, also castings, subcontract for Montana Minuteman project, to Union Iron Works, Spokane, Wash.

513 tons, state highway work, Route 80, Sec. 4C, Bergen County, New Jersey, bids July

18; also required, 1113 tons of reinforcing steel.
500 tons, warehouse, Owens-Illinois Glass Co., Bridgeton, N. J., bids closed June 23.
407 tons, state interchange, Newport, Del., C. J. Langenfelder & Sons Inc., Baltimore, low on the general contract.
359 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia; bids July 5; also, 144 tons of sheets.
253 tons, state bridgework, Bucks County, Pennsylvania, bids July 20; 410 tons of reinforcing bars also required.
200 tons, Central Junior High School, Anchorage, Alaska; two low bidders tied at $1,902,000 base.
160 tons, black, medium tensile; bids July 7, supply officer, Naval Shipyard, Portsmouth, N. H.
125 tons, radar tower, Moses Lake (Wash.) Air Base, to Union Iron Works, Spokane, Wash.
125 tons, Ferris Senior High School, Spokane, Wash.; Selkirk Co., Spokane, low base bid $1,561,267.
117 tons, state bridgework, U. S. Route 130 (1953), Sec. 7C and 9C, Camden and Burlington Counties, New Jersey, bids July 12; 40 tons of reinforcing steel also required.
100 tons, radar installation, Naselle Air Base, Washington State; Charles R. Schmiedeskamp, Milwaukee, Oreg., low at $284,150 to the U. S. Engineer, Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2153 tons, U. S. Engineer, Chicago, to Oregon Steel Mills, Div. of Gilmore Steel Corp., Portland, Oreg.
681 tons, U. S. Engineer, Chicago, to the Buffalo Steel Corp., Tonawanda, N. Y.

REINFORCING BARS PENDING

1113 tons, state highway work, Route 80, Sec. 4C, Bergen County, New Jersey, bids July 18; also required, 513 tons of structural steel.
497 tons, state bridgework, Butler County, Pennsylvania, bids July 20; 1127 tons of shapes are also required.
410 tons, state bridgework, Bucks County, Pennsylvania, bids July 20; 253 tons of shapes are also required.
200 tons, Washington State girder highway span, Clark County; bids to Olympia, Wash., July 11.
135 tons, Washington State girder bridge, King County; bids to Olympia, Wash., July 11.
175 tons, Washington State underpass, Yakima County; bids to Olympia, Wash., July 11.
150 tons, Seattle Pacific College dormitory and diningroom; bids July 14.
125 tons, Washington State bridge, Whatcom County; bids to Olympia, Wash., July 11.
110 tons, Washington State, Raging River bridge; also 35 tons of structurals; bids to Olympia, Wash., July 11.
100 tons plus, also shapes, Idaho State interchange, Kootenai County; Murphy Bros. Inc., Spokane, Wash., low at $2,436,952.

PLATES . . .

PLATES PENDING

283 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, bids July 17.
110 tons, Watertown, Mass. Arsenal; bids July 6.

RAILS, CARS . . .

RAILROAD CARS PLACED

Fruit Growers Express, 210 refrigerator cars to its Alexandria Shops.
Grand Trunk Western, 200 boxcars to ACF Industries Inc., New York.
General American Transportation Corp., twenty-nine 30,300 gallon tankcars to its Sharon, Pa., Shops.
Union Tank Car Co., 125 tankcars, ranging from 10,000 to 30,000 gallons capacity, to its Whiting, Ind., Shops.
Atchison, Topeka & Santa Fe, 100 piggyback flatcars to General American Transportation Corp., Chicago, and 150, forty ft refrigerator trailers to Fruehauf Trailer Co., Detroit.

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Coming

July 10

IN

STEEL

What Chance For Steel Price Hike?

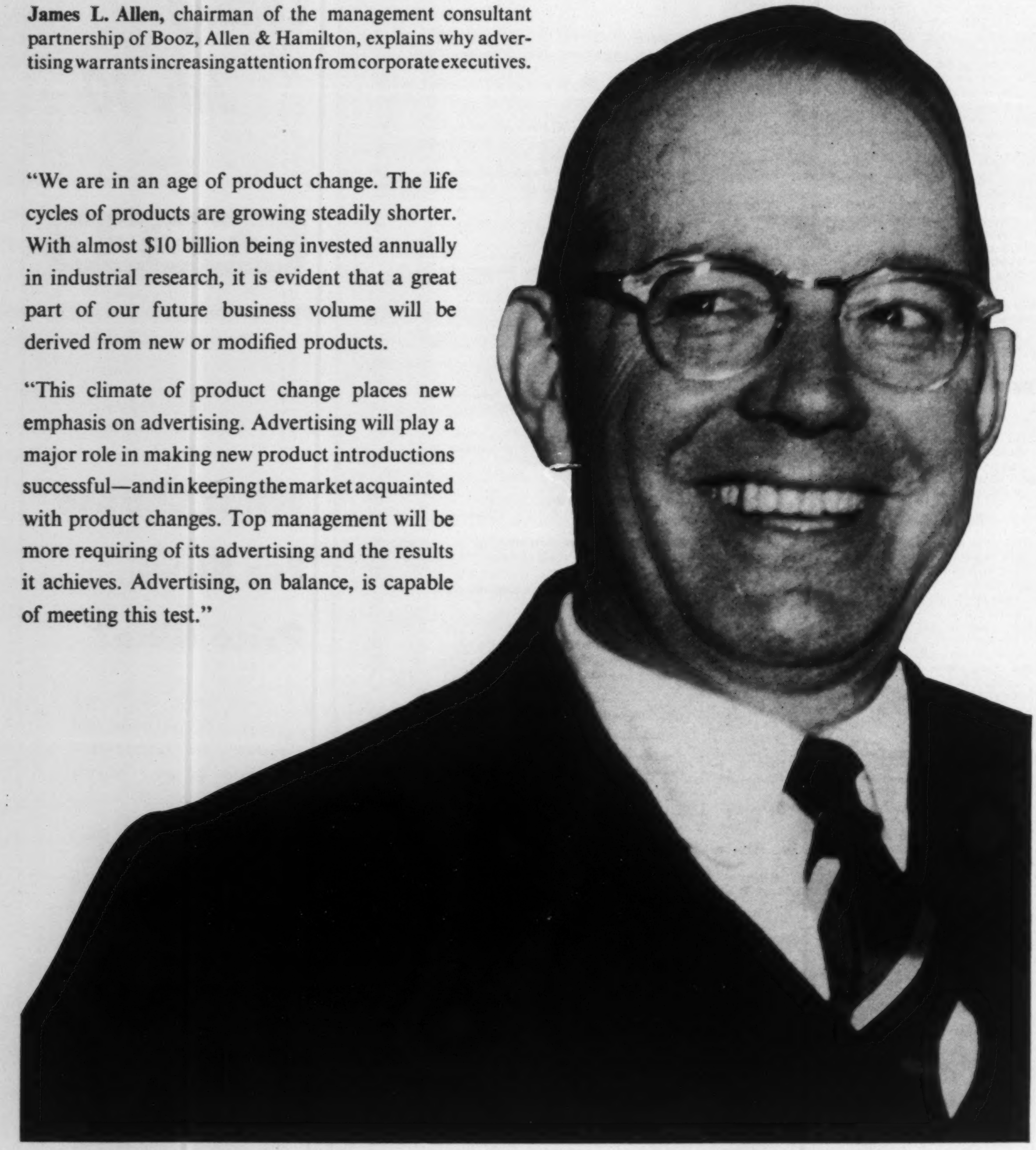
Next week, STEEL will analyze the situation and present the probabilities to help in your buying plans.

The last general price hike, $4.50 a ton, came in 1958. Since then, the industry's employment costs have risen more than 40 cents an hour, and another 12-cent-an-hour boost is scheduled for Oct. 1. But several recent price reductions cloud the pricing picture, even though the actions affect products that account for less than 10 per cent of the industry's total shipments.

For clarification, see the July 10 issue of STEEL.

"More money for advertising! Why?"

James L. Allen, chairman of the management consultant partnership of Booz, Allen & Hamilton, explains why advertising warrants increasing attention from corporate executives.



"We are in an age of product change. The life cycles of products are growing steadily shorter. With almost $10 billion being invested annually in industrial research, it is evident that a great part of our future business volume will be derived from new or modified products.

"This climate of product change places new emphasis on advertising. Advertising will play a major role in making new product introductions successful—and in keeping the market acquainted with product changes. Top management will be more requiring of its advertising and the results it achieves. Advertising, on balance, is capable of meeting this test."

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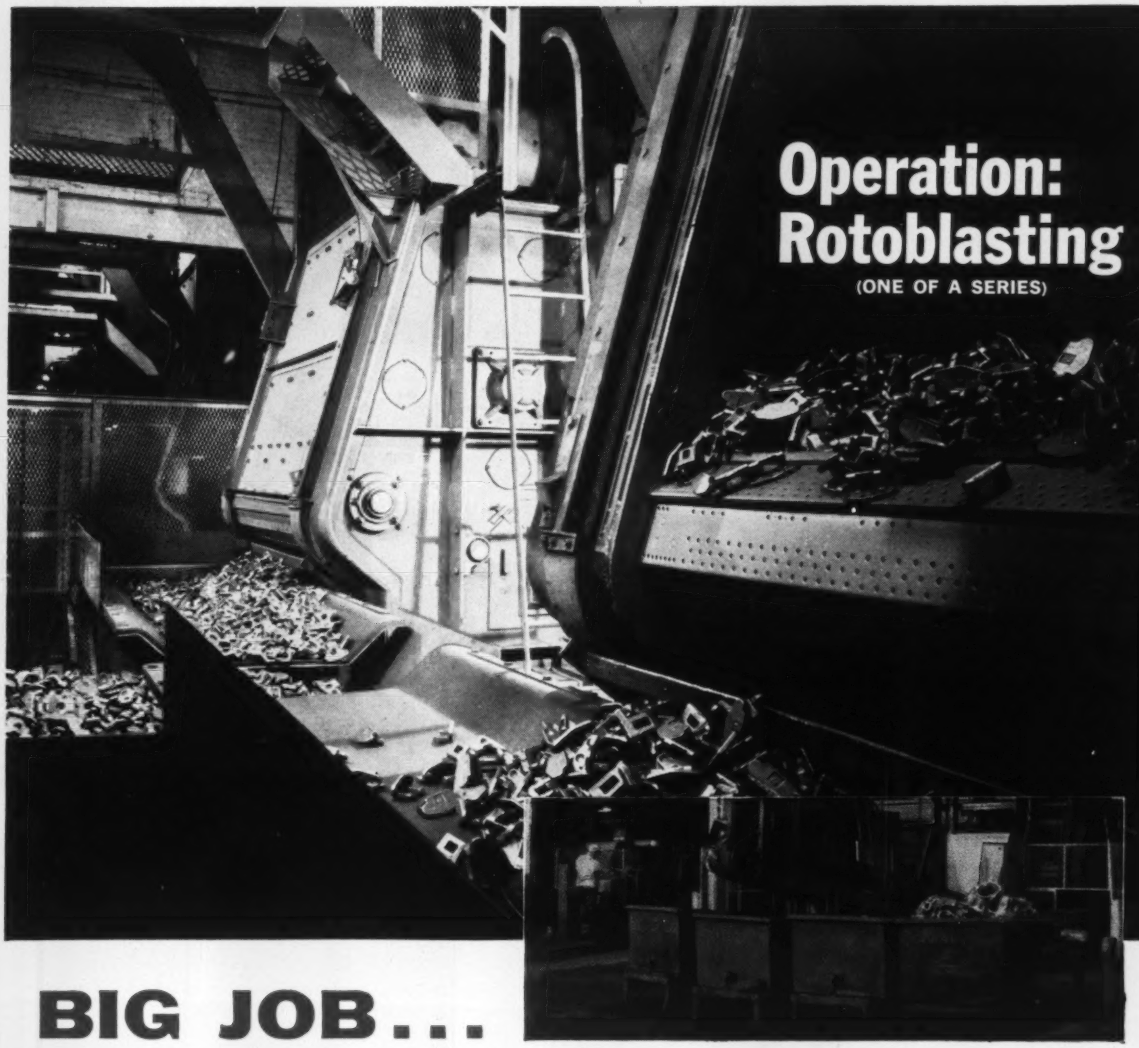

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Day in, day out, seven heavy duty Rotoblasts work hard at cleaning the tremendous volume of castings produced at a large famous automotive foundry in the Midwest. At last count, each of the seven barrels had accumulated more than 600 hours of actual blast time with practically no need for maintenance or repairs.

Proof of the almost completely automatic operation of these machines is that just two men operate a line of six. (The seventh has a separate location for materials handling convenience.)

Whether your cleaning needs are big or small, Rotoblast has a standard type and size for the job, or specially designed equipment can be provided. Labor-saving automation can be furnished in a small unit just as easily as in seven big ones.

Try Rotoblast abrasives, too!

A special heat-treating process makes Rotoblast Steel Shot and Grit solid, tough, able to take more punishment than ordinary abrasives. Because they are *extra* tough, Rotoblast abrasives last longer, work harder and lower your replenishing costs. We'll be glad to go into more detail. Just write:

Pangborn Corporation, 1600 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada, Ltd., 47 Shaft Road, Toronto (Rexdale), Canada—*Manufacturers of Blast Cleaning, Vibratory Finishing, Dust Control Equipment; Rotoblast® Steel Shot and Grit®.*

Pangborn

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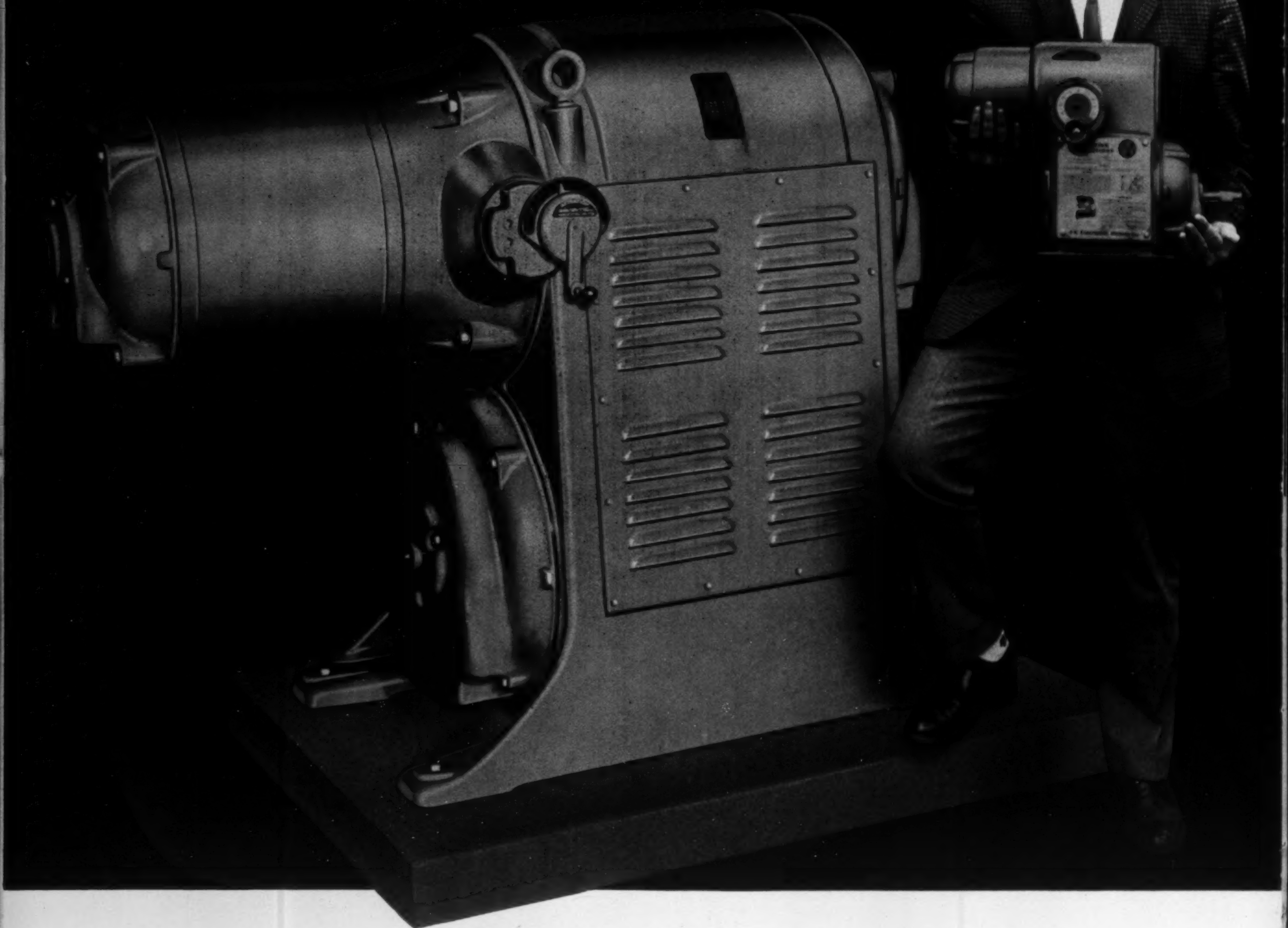

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